Industrial Situation Demands Higher Paper Prices

THE Paper Industry goes into the current year with much improved technical conditions, but like all industry in this country today it has but one major objective—to salvage its operations.

The theory for such salvage is expressed in the following wise formula, "Show us the facts and we will tell you what to do." For facts are definite, stubborn determinative elements upon which alone salvage acts can be successfully predicated.

Since the adoption of the Paper Industry Code of Fair Competition more than a year ago, the Industry has collected, collated and disseminated basic facts and statistics, all of which are now in the possession of every executive of every operating unit of the Industry. They show indubitably and clearly just what the operating policy of the Industry should be in order to salvage its individual and industrial investments.

Here are some of them: "The Paper Industry represents an investment of over one and a half billion dollars. *The ratio of fixed investment to the value of annual production is abnormally high.* The value of 1929 production was about equal to the investment in manufacturing facilities. The value of the 1932 production was less than one-half of the investment. Due to these conditions, the overhead burden, always high, has increased to an abnormal figure. *Prices for products have been depressed to a point which has not returned cost.*" So much for the general situation.

In the Kraft Division, the situation is acute showing additional reason why co-operative operations by all invested units is imperative. The fact is that there exists a definite mill capacity of one million three hundred thousand tons of Kraft paper with a possible market consumption for 1935 of but 832,000 tons, allowing only a 65 per cent operation for that division for the year.

Under the Code Administration for the past year, all companies have been furnished with these facts of production and consumption, and all units have been operating on production schedules, voluntarily accepted, and on basis of price schedules which permitted a bare cost return provided every rigid economic operating factor were observed.

What is the nub of the whole business? Absolute maintenance of production and price schedule in accordance with economic facts which the industrial statistics demand!

In such operations, there is no violation of either civil or economic law. On the contrary, all adherence to the operating production and price schedules developed by the Industry are prime evidences of advanced co-operative salvage.

The Government's fact-finding agencies record that "Prices have been depressed to a point which has not returned cost." The Government hopes the Paper Industry has enough good sense to raise its prices and maintain them on a cash plus basis.

The Codes permit the various divisions of industry to legislate among themselves for their economic salvation. Why not? Who is better able to say what policies the producers of paper should work under than the paper manufacturers themselves?

It would be the economic disaster of the era if the Paper Industry failed of its price-producing opportunity.

Merchandising the Industry

TODAY the paper industry stands on the threshold of a new opportunity. Will it take advantage of this opportunity or be content to go along in the same manner as in years past?

Perfection, of course, is difficult if not impossible of attainment. Just as in sports, the excitement of the game, the many temptations constantly beckoning, the desire for position of advantage, make it doubly hard to prevent mistakes—honest or otherwise. Conditions, however, in the industry today, even though there is yet room for improvement, are much better than those existing not so long ago.

Do not forget that the United States has produced and consumed more paper and paper products since the Civil War than any other country in the world. During this period production increased year after year until by the time of the World War or shortly thereafter it reached a point where it greatly exceeded consumption and commodity prices declined astoundingly along with a great decline in markets. In the future therefore the industry must assure itself of the absence of ruthless competition. This is absolutely essential if it is to contribute its share to the better well-being of America.

Under the National Industrial Recovery Act all phases of the industry have come to realize some of the benefits of better co-operative measures. While production costs have been increased substantially in recent months, the elimination of unsound competitive practices has largely offset the increased costs. There are but few manufacturers in the industry today who would not be happy to be paying wages at a scale which would actually bring about the much talked of and discussed "more abundant life" were it possible. Until the time comes, however, when production and consumption are at a much higher rate and prices assure a reasonable profit, that condition, of necessity, cannot prevail.

It has been conclusively demonstrated that legitimate co-operation among competitors not only reacts to the direct benefit of such competitors, but in the long run benefits the public as well. Every individual in business knows or ought to know that immediate gain at the sacrifice of honesty and fairness is eventually a loss and that production schedules should be planned to iron out peaks and depressions to the greatest possible extent and to maintain production at as nearly a constant level as possible.

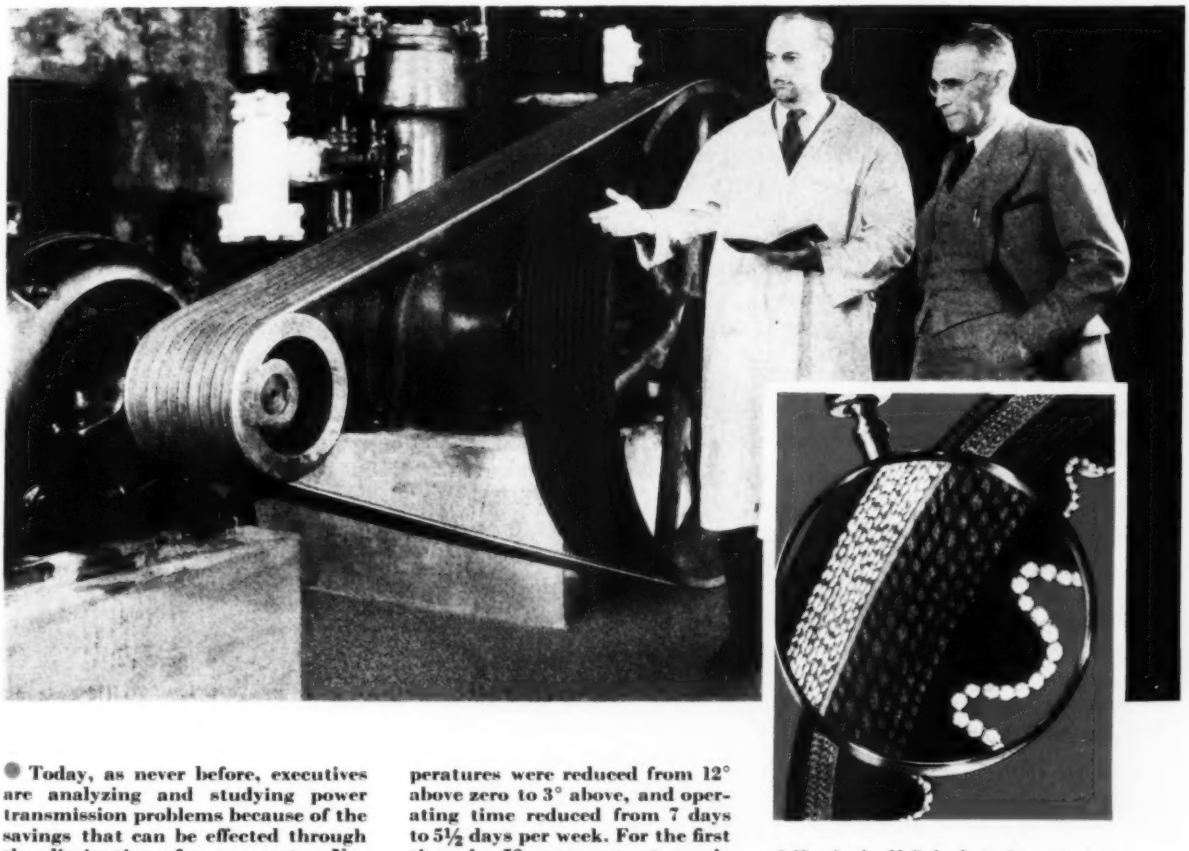
A correlation of the production and raw material factors is bound to result in higher prices, which, in turn, can only result in greater profits. In this connection it is well to bear in mind that constant study and investigation of raw material sources is most important, because the development of a new and cheaper source of raw material plus better and cheaper production units can literally wreck the investment of large sums of money of years standing. Today extensive research investigations are being conducted which may change the whole face of a large part of the production facilities of some of the best known firms of the industry, if the investigations are eventually carried out as expected.

The opinion is expressed now and then that a common research organization will not properly function for the industry as a whole. Nevertheless, research is one of the greatest assets of any industry. What is good for one of any given group is proportionately good for the whole group. Where would the production manager, superintendent or foreman be without proper background? Turn the pages of any trade publication and immediately can be seen the effects of research in behalf of the good of the whole industry. Attend any meetings of industrial groups and listen to the papers presented—all the results of intensive research and study by some one for the good of every one.

It is absolutely essential with such progress in manufacture that the industry make every effort to better merchandise its products. This effort will be necessary if the industry is to reclaim some of its lost markets and to extend the use of paper and paper products into new fields.

◆ IT IS DOUBTED if there is any single asset in business of greater importance than that of confidence. This asset permits any business to push forward in spite of competitive obstacles to such success as the individual business might permit. Should such confidence once gained, be dissipated through unfair business dealings, it might then be regained only with difficulty and perhaps at great expense. Avoid this hurdle by emanating confidence at all times to those within and without your organization.

Turning POWER WASTES into NET PROFITS!



● *Here's the V-Belt that gives greater gripping Power with less Tension. Only Dayton V-Belts have* straight *die-cut sides that* exactly fit *the pulley grooves at all times regardless of speed or load.*

● Today, as never before, executives are analyzing and studying power transmission problems because of the savings that can be effected through the elimination of power wastes. Nowhere else can management find an equal opportunity to reduce expenses and increase net profits.

During the past seven years in thousands of industrial plants troublesome power transmission problems have been solved and real savings effected through the installation of Dayton V-Belt Drives. A production manager in a large meat packing plant said, "Our savings will total thousands of dollars a year. The short center-to-center couplings of Dayton V-Belt Drives permitted two motor-driven compressors to replace one steam compressor *in the same floor space.* Temperatures were reduced from 12° above zero to 3° above, and operating time reduced from 7 days to 5½ days per week. For the first time in 50 years no steam is required in the plant on non-operating days."

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PANACEAS

By WILLIAM SIBLEY

LIKE a great many other Iowa farmers, my father and mother having arrived at an age where comfort is of cardinal importance "joined hands and circled to the West" finding themselves ultimately in southern California. That is where they are today, actively engaged in furthering the Townsend Old Age Pension Plan, thus continuing to follow true to the pattern of many other migrant Middlewesterners.

If it wasn't for the establishment of highly dangerous precedents which will lead directly to costly compromises, we could find interest in the study of the psychology behind the current clamor for such a plan as Dr. Townsend's. The abiding belief in Santa Claus most effectually jumps the gap from six to sixty with apparently no loss of enthusiasm.

Briefly, the Townsend plan proposes:

> That every man and woman more than 60 years old shall stop working for gain.
>
> That the Federal Government shall pay each man and each woman more than 60 years of age a pension of 200 dollars a month; provided first, the pensioner is not a habitual criminal; and second, that he or she will take an oath to spend the entire 200 dollars within thirty days.
>
> That the cost of the pensions be defrayed by a general sales tax.

Of the ten million persons immediately eligible, Dr. Townsend guesses that eight millions would apply for benefits. On that basis, the plan would cost approximately twenty billion dollars a year, not considering the cost of administration. Advocates believe such a dole could be sustained through the increased, large-scale demand for all merchandise which would be the natural concomitant of currently spending more than one and one-half billion dollars a month. As one proponent put it: "the plan is only 30 per cent humanitarian; it is 70 per cent a business recovery measure."

Our national income, during 1934, is estimated to have been 48 billions of dollars. Dr. Townsend proposes that to care for 8 million (out of an entire population of 125 million) we set aside something over 40 per cent of our gross income, which means that 93 per cent of the people of the United States would immediately sacrifice nearly half their earnings in the interest of less than seven per cent of the population.

Entirely aside from the sociological harm that would immediately result from the reckless, needless, thoughtless spending of 40 per cent of our income by a group of people who have long been a prey for investment sharpers, it must be clear that such a division of income would result instantly in violent currency and price inflation. Sorrowfully then, the older people would never be able to realize their dreams of automobiles, radios, travel, books, open-fireplaces and comfortable davenports. They would, instead, be faced with haircuts at five dollars and a meal of California oranges, bread and milk at fifteen dollars.

The chief distress resulting from the Townsend plan is not its possibility for enactment. It never will become law. The costliness of the proposal comes through the *humanitarian* aspects which make it impossible for congressmen, senators, writers, and others to really speak their minds. Anyone who analyzes the proposition in the light of cold logic and tells his findings is immediately branded as being hard-hearted, unfeeling, unloving. The man who says plainly that *somebody has got to pay*, and pay dearly, for the support of *all* non-producers whether infants, criminals, sick people, aged, unemployed, or idle rich, that man is frowned upon as being heartless. The man who suggests that in countless cases the advent of a 200 dollar or 400 dollar monthly dole to living parents would impel whole families to withdraw themselves from the ranks of producers and "live off the old folks" is looked upon as being one capable only of selfishness.

This attitude forces numberless millions to hastily temper their inward criticism of the Townsend plan with the hurried assurance that "of course I am in favor of an old-age pension." And those millions of expressions are crystallizing right now in Old Age Pension bills which spell a costly added burden for the producing taxpayer.

The year 1934-1935 is, quite manifestly, one of crazy action. In our haste to relieve ourselves of a world-wide depression we changed the administration and instituted the order to "get something done." We got. Now, we are rapidly learning that there is a deal of difference between good intentions and good performance. In our desire speedily to escape from both mental and commercial inactivity we hastily advocated a diet of alphabet soup, supplemented with sidedishes of fantastic panaceas cooked up by kingfishes, doctors and professors.

As a result, we find ourselves today about 50 per cent out of the depression woods but with a 100 per cent increase in national indebtedness. For every step forward commercially, we take two backward financially. . . . Honestly, sometimes I wonder where we will wind up!

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THE PAPER INDUSTRY

A MONTHLY EDUCATIONAL JOURNAL

Management Must Lead the Way in Safety

L. J. PARANT

Vice President and General Manager, St. Croix Paper Company

THROUGHOUT the industrial era, management has improved processes of manufacture by purchase of new equipment and materials and the installation of efficient methods of doing business. The net result has been a better product and increased production at a lower manufacturing cost. Those unable to keep pace with the march of progress could not meet the new competition and were forced to close their mills.

It is a strong assertion to make that while manufacturers were making these physical changes in their properties there were those who neglected to give thought to the most precious thing of all—*the protection of human life.* Unconsciously they ignored the right of men to labor under safe working conditions. *Engineering, education* and *enforcement,* the three E's of safety, have been entirely out of their scheme of plant management; consequently, high frequency and severity accident records have been the result.

What does it profit an industrial plant to produce a fine quality of goods at the expense of the loss and crippling of lives? But that is just what is happening in the amazing speeding up of modern industry. These advances have been overshadowed by the needless occurrence of accidents.

Industrial accidents are chargeable to production. When a man loses his life at work, there is a greater cost than many may realize. It isn't just one of those twists of fate that was to happen and can be forgotten, except for paying the widow a few years of compensation. With the payment of that cold figure, the estimate of the cost has only begun. That death usually results in the family's plans for the future being completely dissipated; the children's education is limited; and, in many cases, society has to step in and give a helping hand. Therefore, it is evident that it is almost impossible to measure the exact cost of either the loss of a worker's life or of crippling him so that he is unable to work. However, it is a fact that industry and society pay an enormous bill each year for accidental deaths and disabling injuries.

All this leads to the thought as to where the responsibility for industrial accidents should be placed. Surely if it is a problem of industrial management, it is management's duty to solve the problem. Management should not be concerned with the cost of safety but with what can be done to conserve the lives of the industry's workers. That means nothing more than simply being humane.

There is no better reason for getting behind the safety movement than its humanitarian aspect. And in industry, management must lead the way, whole-heartedly, regardless of costs, in order to insure to employees that God-given right to live and not to die or be crippled in the performance of their work.

Technical Control in the Manufacture of Sulphite Pulp

R. S. HATCH, Director of Research
Weyerhaeuser Timber Company

IN TRACING the history of the growth of technical control in the sulphite industry through the seventy-odd years which have elapsed since its inception, it will be found that technical control, as we now understand the term, played a very small role in the operation of the mills up to the dawn of the twentieth century. Up to that time, technical control such as was exercised was confined to a few simple chemical tests, such as analysis of acid, while the operating control was vested in those who had learned the process as a trade or an art in which experience and skill were handed down from person to person much in the same manner as the experience and skill of the glass maker or the steel maker was handed down in the earlier days of these industries. Today, there is little of art or mystery in the manufacture of glass or steel. Each of these products is made to meet exacting specifications under rigid technical control, and it is safe to say that both of these industries have passed from the state of an art to that of a science.

The sulphite industry is rapidly following the same evolutionary path which has brought the glass and steel industries to the stage of perfection which they enjoy today. That path, however, is beset with many more difficulties. Glass and steel are inorganic products, the composition of which may be determined with a high degree of accuracy, and for this very reason the physical properties may be changed and controlled with great precision. The manufacture of sulphite pulp begins with wood, a product of nature varying with species, environment and method of preparation. Even after years of painstaking study of the physical and chemical structure of wood substance, many problems are yet to be solved before a sufficiently broad knowledge is acquired upon which to base a truly scientific procedure. In the cooking process, unsolved problems are again encountered. It is known that a solution of calcium bisulphite containing an excess of sulphur dioxide has the property of dissolving under heat and pressure, the lignin component of the wood substance, but even today after years of research, the exact constitution of lignin or the exact mechanism of the reaction by which it is rendered soluble through the action of solutions of sulphur dioxide are not known.

With so many variables in raw materials and so many unknown factors in the processing of those raw materials, the problem of technical control might be said to be divided into two basically different methods: one, the well-known exact analytical method which deals with those adjuncts of the process which are susceptible to tried and proven means of evaluation; the other, which deals with those elements of the process which are still of an empirical nature because of lack of knowledge of the mechanism of the reactions involved.

The first mentioned method may be dismissed with comparatively little description. Technical control by laboratory methods of analysis or the building up of records of precisely controllable variables through the choice of the proper instruments is a function rendered by departments of technical control in so many varied industries that no good purpose will be served in attempting to describe either equipment or specific methods. Through the very fine work of the Technical Association of the Pulp and Paper Industry, methods of analysis standard for the industry are being rapidly developed and adopted. In this respect, the industry has made very rapid strides during the past twenty years and it may now be considered in the front rank of industry in this phase of technical control.

The second mentioned problem of technical control which deals with those more or less empirical phases of operation is that which should receive the most emphasis and the most serious thought on the part of all who are charged with the operation of or the shaping of the operating policy in the sulphite or the chemical pulp industry as a whole.

Science is busily engaged in finding solutions to the problems which still confront the sulphite industry, but while these problems are being solved slowly, the industry *is* advancing. Sulphite mills are competing with each other in constant effort to produce a product of improved quality at a lower cost. Customers are asking for greater uniformity and for better quality because they in turn are constantly forced to aim at perfection in order to hold their place in the industrial march.

This constant struggle for improved, uniform quality places a grave responsibility on the operating and technical staffs of the modern mill. In the period from which the industry has well nigh emerged, when the making of chemical pulp was considered to be more an art than a science, there were outstanding examples of quality production, and much credit is due those pioneers who by sheer skill were able to attain and hold a commanding place in the industry. Unfortunately, nature too often stepped in with new and unknown variables with which the best of skill and experience, unbacked by scientific methods, could not cope. These unfortunate experiences resulted in a product which often fell short of the high standards set under more favorable conditions and resulted in loss of profit or of business.

The more insistent demand for a higher degree of uniformity has forced those in charge of technical control to step out of their accustomed role and find new means of controlling, recording and evaluating those phases of the process not susceptible to exact analytical methods.

Perhaps at this point it will be well to bring out the

distinction between what has been termed exact analytical methods and those methods which can be used to evaluate, and to compare the parts of the process which, for lack of a better term, have been called empirical. Although there are phases of the process which are recognized as empirical because of the realization that there is not yet sufficient scientific knowledge upon which to base a scientific method of procedure, nevertheless, there are many precise tools with which to gather a wealth of knowledge. When properly assembled and viewed in relation to other factual data, these tools make it possible to draw sound conclusions as to the probable best methods of control in the case under examination.

To illustrate the problem of technical control in the less thoroughly understood part of the process, take, for example, the cooking of the wood. If a single species is being dealt with, it may be assumed that within certain reasonably restricted limits the ultimate chemical composition will be the same. It is known, however, that the physical structure may vary widely, depending on age and conditions of growth. By careful control of equipment, chip size within optimum limits may be controlled, and the moisture content of the prepared chips may be determined accurately. The chips may be weighed into the digester and a measured amount of acid of predetermined composition may be added. So far, with the exception of the physical and chemical structure of the wood substance, strictly controllable factors have been dealt with. Controllable factors still may be dealt with, but at this point, the cooking process enters the realm of empirical practice. Experience has proved that certain rates of steaming, certain maximum temperatures and certain acid strengths may be expected to give certain physical and chemical qualities to the finished pulp. Steam flow, temperature and acid strength are all susceptible to perfect control with instruments which are rugged and subject to exact calibration. Thus it is possible to get a true historical picture of any particular cook, but if this picture is viewed alone, there is little upon which to base an operating policy. It is necessary, therefore, to find a means for gathering the data on the variables, in so far as they may be accurately measured, and to put them in such a form as to show the relation of one to the other and to the resulting product.

The human body and the human mind function as an efficient unit because of memory. Experiences, knowledge in the abstract and contacts with the outside world are stored in the memory and called upon at will for the benefit of the individual. Likewise, the arts and the sciences possess a memory through the vast literature which has been built up through the years. No single mind can accumulate and hold the vast amount of data essential to the successful control of modern processes. It becomes necessary, therefore, to build up an industrial mind for a process of this type, one which has the function of memory or the recording of past experiences in an orderly manner, to the end that errors once made will not be repeated, and that progress in improvement of quality and uniformity will be made continually.

One of the simplest means of building up an industrial memory is by means of graphic records of each measurable variable on a daily, monthly and annual basis. Departures from standard practice may be detected quickly from an examination of the daily records. An examination of the monthly or annual records will reveal trends for better or worse.

The graphic record has another important function in the control of operation. If the variables connected with one phase of the operation are grouped with physical and chemical properties of the finished product, an inspection very frequently will determine the direction in which changes in the process should proceed to insure a more uniform product, or one of higher quality. In following out this idea, suppose the graphic records of the variables entering into the cooking process are grouped with the physical and chemical properties of the finished pulp. The result would be a series of parallel records which would include the weight and moisture content of the chips, the volume and strength of the acid, the maximum cooking temperature, the strength of the acid at significant parts of the cook, the digester pressure, the color of the liquor at the blow and any other variables which experience might show to have an influence on the procedure. Coupled with these records would be the bursting strength, tear, fold and freeness of the finished pulp together with alpha cellulose content, copper number, viscosity and other chemical properties. An inspection of these records built up from day to day and from month to month will show just how material changes in any one of the cooking variables will affect one or more properties of the finished pulp and will enable the operator to adjust the cooking variables so that the best and most uniform results may be obtained.

It should be understood, of course, that the physical measurements of the variables which may affect the obscure or less known phases of the process are not the only ones that can be recorded profitably in graphic form. The advantages to be gained from the complete recording of all data pertinent to the process are so great from the standpoint of control that the most successful operation is measured principally by the wealth of orderly recorded data and its use.

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Conditioning Lithographic Paper

In a study of the relation of moisture content of lithographic paper to distortion in multicolor offset prints, the National Bureau of Standards has found in a press room operating at 45 per cent relative humidity, that the moisture content of the paper remained practically constant when the paper was pre-conditioned to approximately 7 per cent above the press room condition. This is an important point in obtaining accurate register of successive prints since it appears to offer a means of avoiding dimension changes in the paper caused by moisture from the wet printing plate. In normal commercial practice, the paper is conditioned to equilibrium with press room air, and water from the plate causes it to expand during the first few printings. By starting the printing with the paper in moisture equilibrium with the higher humidity the loss of moisture caused by the lower press room humidity and the gain of moisture from the press were balanced, and no expansion occurred.

Use Requirements of Gumming Paper

FRED HOLT, JR.
Director of Research and Development
Brown-Bridge Mills

THE Gumming Industry has assumed real importance in the paper trade during the past ten years and undoubtedly will find new and extended uses for its products in the years to come. The simple change from tying packages with string to sealing them with gummed tape developed a new business of tremendous proportions. Revolutionary changes in packaging and labeling brought gummed labels and seals into prominence. Corrugated box manufacturers, paper box makers, the electrical industry, the metal trade and veneer furniture factories are only a few of the consumers of specialty gummed papers. It is not an exaggeration to say that gummed paper can be stuck to almost anything.

The papers used by the gumming plant may be divided into two general classes: kraft papers for sealing tapes and tapes for corrugated boxes and veneer work; and printing papers for labels, printed tapes, and specialties.

Gumming kraft is a sheet as distinctly different as a wrapping or an envelope kraft. Its outstanding requirements are finish, strength and sizing. A sheet is needed which is flexible, strong, dense and hard sized. Gummed kraft and toughness should certainly be synonymous as the paper must be proof against the pulls and jerks of large tension dryers, combined with the penetrating and weakening action of a hot, water solution of adhesive. Such treatment naturally requires a sheet with high wet strength.

The necessary properties of the paper in the order of their decreasing importance might be listed as follows:

1—Ream Weight
2—Tearing Strength
3—Bursting Strength
4—Sizing
5—Density
6—Finish
7—Wet Strength
8—Caliper

Paper for gumming is bought on a weight basis mostly as 35 lb., 60 lb. and 90 lb. (24 x 36—480). The 60-lb. paper enjoys the greatest volume because it is the weight used for sealing tape. The 35-lb. paper is popular for small packages such as are made in grocery and drug stores; while 90-lb. stock is used where great strength is needed as on very heavy bundles or on paper box corners.

Since all kinds of paper were being submitted formerly as gumming kraft, it became necessary to define a "No. 1 kraft" for the trade. In 1929, a set of specifications, including minimum Mullen, tearing strength and tensile strength was set up. These specifications are known as the *Simplified Practice Recommendations* R-114-30, published by the United States Department of Commerce. At that time, very few mills were able to supply a paper that would meet these tests, and a premium was paid for it. Now, almost any quality kraft mill can better these requirements. In doing so, however, there is an important point which many of the mills have overlooked. These specifications not only set up a set of minimum tests but showed a desirable *balance* of tests. This may have been unintentional at the time but since then it has been found that those mills deviating from this balance have run into trouble. Sheets have been submitted with Mullens of 75-80 with low tearing strength. These papers have proved to be very brittle and brittleness in the sheet is fatal. The gumming itself tends to make the sheet *tinny* so the paper must have the toughness and flexibility to make up for this. It should be remembered that sealing tape goes over box corners and holds springy box edges together. A brittle snappy paper will tear under the least strain and will not be satisfactory.

Other papers have been submitted that have accentuated the toughness and flexibility by increasing the tear and folding qualities, but at the expense of the density, Mullen, formation and finish. If these could be forgotten, the gummer could use a wrapper kraft. But they are very important when the adhesive is applied. These too soft sheets also have an undesirable tendency to split especially in the higher weights.

Mills are furnishing sheets with everything from a machine finish to a high water finish. This is a matter for the gumming plant to decide for itself. The object is to keep the adhesive from any unnecessary penetration of the paper. The adhesive that enters the sheet is lost as a bonding agent and tends to make the paper tinny or brittle. It is for this reason that an open, porous paper cannot be used. A dense sheet with a high finish will mechanically hold the adhesive on top of the paper, and hard sizing will make the fibers water resisting, preventing their absorption of the solution.

Caliper is a secondary matter, although a variation in caliper will change the size of a roll of gummed tape when run to a definite yardage.

There is certainly no objection to an increase in tests of the sheet, but none of the other properties of the paper must be disturbed.

English finish, supercalendered, plated and flint glazed sheets are all gummed as regular items for labels, printed tapes and specialties. It is still believed in some quarters that gumming a sheet limits its use by the printer. Years ago this was true, but today there is no printing job that can be done on paper that cannot be done on gummed paper. The gummed sheet is supplied perfectly flat and stays that way. Flatbed or rotary presses, multicolor printing, stone or offset lithography are no obstacles to gummed paper. Printing is even done on the gumming itself for some jobs. It is true that printing speeds are a little slower but the

extra profit in gummed paper much more than makes up for this loss.

Sheet properties of papers for such purposes in the order of their decreasing importance might be listed as follows:

1—Tearing Strength
2—Tensile Strength
3—Bursting Strength
4—Sizing
5—Wet Strength
6—Color
7—Formation
8—Finish
9—Bulk

When supplying such paper, it must be remembered that the paper must serve both the gummer and the printer. Hence, the appearance and printing qualities of the sheet should be given careful consideration. Necessary gumming qualities has been listed as the property of paramount importance, as without such qualities the paper never could be gummed and sold as gummed paper. Consequently, the properties which affect the appearance are secondary; although they must not be underestimated since they sell the sheet after it is gummed.

These papers are a lot weaker than the krafts used and give the gummer much more trouble. There are many more machine breakdowns and loss of material with these papers than with krafts. For this reason, the tearing and tensile strengths of the papers assume greatest importance. Brittle, short fibered papers with low tearing strength will snap under the strain of the machines. The best of the papers are none too good in this respect. During gumming the sizing and wet strength factors must also be considered. Fortunately, a sheet sized for gumming is generally very satisfactory for printing.

After the gumming operation, there is a processing period of approximately two weeks. It is a period of critical treatment for this class of papers and requires rare skill and experience. The purpose is to make the paper lie flat when cut into sheets. These are known as flat papers, and are truly that.

Wide changes in relative humidity and temperature are possible before any curling is noticed in a properly treated gummed paper. The non-curling feature depends entirely upon this processing. Part of the treatment is to draw the paper over knife edges at sharp angles under a severe tension. These knife edges are set so that some come in contact with the gummed side, others with the printing side of the sheet.

The action of the apparatus is to pull all the stretch out of the paper and to break the continuous film of adhesive into particles of macroscopic size. Differences in weight and finish of the papers require change in treatment. If the stock is not uniform, each roll must be handled as a separate case. The stress on the paper is very high and it is here that the stronger and better gumming sheet proves its value.

The brittle, low tear paper will crack on the knives and snap off. Absorbent papers will result in a poorly conditioned sheet in spite of the skill of the operator. If the paper is absorbent, the adhesive strikes deeply into it. The film of adhesive inside the sheet will not be affected by the processing and will make the paper curly. It also increases the stiffness.

Imperfections of the sheet show up here with a vengeance. Calender cuts, slime spots, bad edges and wool threads from felts will all cause the paper to snap. When one of these imperfections hits the first knife edge the result is the same as when it hits a slitting knife on the paper machine rewinder. One in a hundred goes through without breaking down the sheet.

From a selling point of view, Mullen, appearance and bulk are of greatest importance because these papers are sold just the same as regular ungummed printing papers. Color, finish, formation, brightness and bulk must all meet the consumers' standard; and since every jobber has a Mullen tester, the Mullen should be as high as the other properties will allow.

In conclusion, it should be stated that a poor roll can give as much trouble and cost as much from loss of time and material as a poor sheet of paper.

One of the most common faults found with a roll is a soft edge. One edge will be wound tight and hard, the other soft and mushy. A roll of this kind will not run straight on the machines, will form longitudinal wrinkles when the adhesive is applied and will not take an even coat of gumming across the sheet.

Another common trouble is with splices. The gumming plant cannot use rubber splices. Paste or gummed tape must be used and each splice marked. Rubber splices always let go under the action of the hot gum. This means a loss of paper and machine time.

Every roll should be wrapped in waterproof paper and protected at the edges so the ends will not be jammed in handling, and everything possible should be done to prevent the formation of moisture wrinkles.

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Repairing Patented Paper Machinery

W. F. Schaphorst, M. E.

ACCORDING to the law, you as an owner of paper machinery have no legal right to make repairs on the portions of such machinery that are patented. Perhaps you *have* paid in full for the machinery. Perhaps it *is* legally yours. But that makes no difference in the eyes of the law when it comes to repairing or replacing the *patented* parts. You may break or completely destroy the patented parts if you feel like doing that. Ownership permits destruction but it does *not* permit *building up* of machine parts that are protected by law.

Patents often apply only to a few specific parts. You may do whatever you wish to the *unpatented* parts, of course. But the patented portions must not be repaired by you or by anybody else without the permission of the patentee. Anybody furnishing parts for patented portions or repairing those parts who is not licensed by the patentee to do so is subject to damages for infringement.

Paper Expectancy for 1935

WILLIAM BOND WHEELWRIGHT

RECORDS of the past may be used to advantage when studying production trends of industry. The year 1920, for example, was a prosperous one both for the business of the United States as a whole and for the paper industry in particular. In fact, there was but 14 per cent idle machine capacity in paper manufacturing during the year. Then the industry experienced a short, sharp panic in 1921, from which it recovered with a vengeance. There was a 47.8 per cent production increase for the years 1921-1923, 14.3 per cent for 1923-1925, 9 per cent for 1925-1927, and 11.38 per cent for 1927-1929.

A comparison of the recovery in the years 1922-1923 with the gain of 1933 over 1932 will reveal an interesting similarity. The annual gain for 1922-1923 was 14.3 per cent, while 1933 production exceeded that of 1932 by 16.33 per cent. The year 1934 apparently gained little over 1933, but there were good reasons for such "marking time." Stocks had been replenished by speculative buying in 1933; the fall elections were to determine the complexion of Congress for two years; and the N.R.A. was seesawing in the balance.

Today, the psychology of the situation is radically improved. As shrewd an industrialist as Henry Ford declares that it doesn't make any difference what they do in Washington, and he is backing up his belief with increased advertising and large plant expansion. Others are beginning to do likewise. Dividends are being declared on an increasing scale. Farmers are more prosperous. Retail trade is more active, and Uncle Sam himself with eleven and one-half billion dollars in his jeans is ready to start on a shopping spree.

On top of all this is the tremendous potential demand which has accumulated during five years of skimping, scraping and doing without. The Nation is all set to "go places and do things." In such circumstances the law of averages, which has suffered interruption, is bound to reassert itself with vigor.

In 1930, the population of the United States was 122,775,046; but every fourteen seconds a birth occurs, and every fourteen minutes an immigrant arrives. After deducting the deaths and departures from the country, a net gain in population of one for every thirty-seven seconds remains! This means that there are approximately 850 thousand new consumers a year in the United States and that our population today should be around 127 millions.

In 1933, the per capita consumption of paper amounted to only 143 pounds. Now there is a distinct trend that this per capita consumption is again upward, and the natural question is, "How much will they buy?"

Men like S. L. Willson, high in the industry, are optimistic, but are evidently reluctant to make any very definite prophesy for 1935. In January, Mr. Willson was quoted as saying, "It takes a bold man to predict what is ahead for 1935. But I feel bold. I've revived my nerve and am willing to predict that 1935 will prove to be a better year than 1934, and that the improvement will be greater than was 1934 over 1933." L. C. Reynolds, Comptroller of the American Writing Paper Company, stated, in a recently published article, "In the month of September, 1932 I made the observation that we had apparently reached the bottom of the depression curve and at that time pointed out how we had repeated thus far the experiences of the post Civil War period, both with regard to depressions in business volume and with regard to inflation and deflation of commodity prices; and further pointed out that a completion of these experiences would bring us out of the existing depression in 1936.

"We have had very wide undulations in our curve of business progress during the last two years, undoubtedly affected by artificial forces new to our economic life. If the speculative buying of the latter half of 1933 and other variations in this curve were adjusted, we would find that the year 1934 shows about the same progress as 1933 shows progress over the low point of 1932. But the slope of this upward curve is not such as will bring us out of the depression as quickly as would be anticipated should we repeat completely the experiences of the post Civil War period. On the other hand, the upward curve may not prove to be a straight line, but it is possible for an acceleration which would bring us back to normal much faster than anticipated."

This accelerated recovery is precisely what is expected and predicted. The gain thus far has had little assistance from durable goods industries but a reawakening in these channels now has become apparent. The factor of advertising is far greater than in the post Civil War period. Surveys conducted last autumn by the Dartnell Company indicate much greater expenditures for printed salesmanship in 1935. In their January issue of *Printed Salesmanship* an increase of at least 20 per cent in dollar Volume of Direct Mail was predicted for the year. Then again, business of calendar and direct mail manufacturers is gaining fast, as indicated by a private communication dated January 22, from a very large producer. This producer stated, in part, "Our weekly sales have been running anywhere from 20 to 40 per cent ahead of last year." Such situations are the reverse of the past two years together and present a significant omen.

Rather than revert to the post Civil War period to forecast the progress of paper, it would seem apropos to consider only the years from 1920 on. Here is what they show:

Paper Production

Year	Short Tons	Per Cent Gained
1920	7,334,600	
1921	5,431,265	26. loss
1923	8,029,482	47.8 gain
1925	9,182,204	14.3 gain
1927	10,002,070	9. gain
1929	11,140,235	11.38 gain
1930	10,169,140	8.71 loss
1931	9,381,850	7.74 loss
1932	7,900,000	15.8 loss
1933	9,190,017	16.33 gain

There is every reason to believe that the year 1935 will show recuperative powers not less but greater than did the year 1933. The percentage of gain over the preceding year should in this case exceed 16.33 per cent. The author risks the prophecy that it will be at least 20 per cent, and that the total production of paper in the United States for 1935 will exceed eleven million tons. It is his conviction that it can be more if those companies and associations having a vital interest in the increased use of paper and of printing act more aggressively and lend their support to the movement recently suggested by the National Printing Equipment Association. This association has appointed a committee to canvass the allied industries on their attitude toward a national campaign to increase the consumption of printing.

If it proves possible to agree upon a campaign and secure enough funds to proceed, time will be required to mobilize for such work. Therefore, it behooves those who recognize the advisability of aggressive salesmanship to get busy.

But along with those who produce printing and writing papers there is equal opportunity for those who produce other grades. It has been well stated in the text of the Paper Salesman's Training Course, of the La Salle Extension University: "Today is a day of competition between industries . . . papers, tissues, boards—can compete with steel, iron, glass, rubber, and wood. . . . Can compete with silk, wool, cotton, and leather. Paper has met *all* of these substances on the battlefield of economic competition, *and emerged the victor time and time again.*"

In the past, whatever success the industry may have had in this economic battle was due largely to individual effort. Such will continue to be the case, as nothing can take the place of individual enterprise. Yet it is believed that group co-operation will stimulate progress more quickly than can possibly be hoped for in any other manner and that with such co-operation in view of the industry's present statistical position there will be much better times ahead for the entire industry.

Paper consumption by kinds and per capita, specified years beginning 1810[1]

Year	Newsprint		Book		Boards		Wrapping		Fine		All other		All kinds, quantity	Per capita, pounds
	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent		
	Tons		*Tons*		*Tons*		*Tons*		*Tons*		*Tons*		*Tons*	
1810													[2] 3,000	1
1819													[2] 12,000	2
1839													[2] 38,000	4
1849													[2] 78,000	7
1859													[2] 127,000	8
1869													391,000	20
1879													457,000	18
1889													1,121,000	36
1899	569,000	26	314,000	15	394,000	18	535,000	25	113,000	5	233,000	11	2,158,000	57
1904	883,000	29	495,000	16	521,000	17	644,000	21	142,000	5	365,000	12	3,050,000	74
1909	1,159,000	27	689,000	16	883,000	21	763,000	18	193,000	5	537,000	13	4,224,000	93
1914	1,576,000	29	926,000	17	1,292,000	24	892,000	16	244,000	4	566,000	10	5,496,000	112
1917	1,824,000	29	846,000	14	1,805,000	29	814,000	13	276,000	4	691,000	11	6,256,000	122
1918	1,760,000	28	800,000	13	1,927,000	30	859,000	13	348,000	5	693,000	11	6,387,000	123
1919	1,892,000	29	838,000	13	1,940,000	30	825,000	13	306,000	5	692,000	10	6,493,000	124
1920	2,196,000	28	1,060,000	13	2,301,000	29	1,003,000	13	371,000	5	930,000	12	7,861,000	148
1921	2,002,000	33	707,000	11	1,641,000	27	770,000	13	230,000	4	704,000	12	6,054,000	112
1922	2,451,000	31	968,000	12	2,154,000	27	1,059,000	13	356,000	4	1,015,000	13	8,003,000	146
1923	2,814,000	30	1,235,000	13	2,802,000	30	1,177,000	13	374,000	4	938,000	10	9,340,000	167
1925	3,073,000	29	1,365,000	13	3,290,000	31	1,287,000	12	472,000	5	1,103,000	10	10,590,000	184
1926	3,517,000	30	1,408,000	12	3,637,000	31	1,435,000	12	495,000	4	1,315,000	11	11,807,000	203
1927	3,492,000	29	1,265,000	11	3,737,000	31	1,515,000	13	502,000	4	1,404,000	12	11,915,000	202
1928	3,561,000	29	1,321,000	11	4,009,000	32	1,457,000	12	538,000	4	1,562,000	12	12,448,000	208
1929	3,813,000	29	1,471,000	11	4,398,000	33	1,586,000	12	593,000	4	1,490,000	11	13,351,000	220
1930	3,496,000	28	1,370,000	11	4,014,000	33	1,556,000	13	564,000	5	1,251,000	10	12,251,000	199

[1] Imports added to United States production and domestic exports deducted.

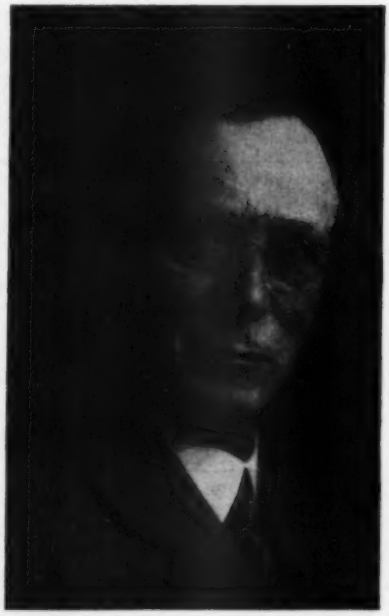
[2] Domestic production only, value of exports and imports being approximately equal. No data for 1829.

A computed table based on data credited in the tables of compiled record. Printed as table 3, U.S.D.A. Bulletin 1241, 1810-1922. Tons of 2,000 pounds. Reproduced from *A National Plan for American Forestry*, 1933.

Future Outlook Based on Experience

S. L. WILLSON

Mr. Willson tendered his resignation as Chairman and member of the Paper Industry Authority at an open meeting on January 17, 1935, at the Waldorf Astoria Hotel in New York. The accompanying article is the complete text of his address on that occasion. On the same date, he also resigned as president of the American Paper and Pulp Association, and as a member of the Board of Governors. *—Editor's Note.*



AT THE Annual Meeting in February, 1929, I was elected President of the American Paper and Pulp Association. I have been re-elected to that office on two occasions. The time has come when I feel that I must pass on to another the burden of that office. This morning, at the Board of Governors Meeting, I submitted my resignation as President of the American Paper and Pulp Association and as Chairman and member of the Paper Industry Authority. This is the last time that I shall appear before such a large representative gathering of the industry as President of the industry's central organization.

When elected President of the American Paper and Pulp Association in 1929, my purpose was to bring about a reorganization of the Association that would better fit it to meet the requirements of the industry. With the assistance of such men as Hugh Chisholm, Norman Wilson, Clark Everest, Charlie McMillen, Frank J. Sensenbrenner, and here naming but a few from the many who helped, we attempted to establish an organization having the character of an institute which under the direction of a manager would initiate and lead in cooperative activities of a tangible nature. You all know what happened. The depression came immediately thereafter. Forced with the necessity of curtailing expenditures, member companies resigned to such an extent that the Association disintegrated to practically a skeleton organization and was not representative of the industry. The reorganization failed.

Then came 1933 and the enactment of the National Industrial Recovery Act. The organization of the divisional associations and their merger into a reorganized American Paper and Pulp Association constitute mile posts in the progress of organized activity in the industry. On November 17, 1933, the President approved our Code of Fair Competition. Since that date we have operated, not perfectly perhaps, but more wholeheartedly than ever before as an organized industry entity.

After six years of struggle we have accomplished what we set out to do. We have built up an organizational structure and for one year at least the industry has operated through its organization. With the reorganization completed the job that I originally attempted to do is now finished. Before the industry lies many problems of organization management, of fitting organization procedure to the needs of the industry, of developing in the industry's executives not only the spirit of cooperative activities but recognition of the necessity of group approach to competitive, labor and production problems, which the depression has taught us is necessary. I feel that the task of consolidating the progress we have made and of further development is one that does not fall within the terms of my original obligation to the industry.

Furthermore, it is not easy these days to manage a large company, particularly one that in attempting to preserve the competitive structure of the industry must for the time being at least carry a burden of idle capacity. The seven idle mills of my company, in addition to the seven operating units, constitute in the aggregate problems of such magnitude that all my time is needed.

In relinquishing my obligation and turning it over to others I want to comment upon certain developments that have seemed to me to be important; developments that represent progress in the thinking of the industry and in the whole trend of the industry's future growth.

The outstanding progress has been in organization. I consider this more important than the tangible benefits that have accrued from our organizational activities, such as the stopping of price demoralization in 1934 and the elimination of many of the factors from our competition that brought about that demoralization; the refinement of our trade customs; the beginning of our grading program, and even the establishment of a foundation upon which management may deal with labor. I hold that the development of our organization, in importance, transcends these specific accomplishments because none of them could have been accomplished without organization, and because organization is essential, first, to maintain what we have already obtained and, second, to make further progress.

Rebuilding the Association in the spring of 1933 was much different than it was in the spring of 1929. In the intervening period the industry had learned many lessons. It had learned, for instance, that no matter what the status of an individual company may be that that status cannot be improved, in fact, it cannot be maintained, if competitive warfare is waging in the industry or in any major part of it. In 1933, the industry's executives were more willing than ever before to merge their interests. I have only to point to the organization of the Book Paper Manufacturers Association as an outstanding example. The Book Paper Association under the initiation of Mr. Phil Glatfelter and the able leadership of Mr. Geo. H. Mead reached the point eight months before the enactment of the N. I. R. A. where the individual members realized that something had to be done to stop destruction. The same idea motivated other groups; the Kraft Paper Manufacturers Association was reorganized; the Sulphite Wrapping Paper group was revitalized; and in the smaller groups competitors began to think in terms of the group. It is significant that these activities, born largely of desperation, were under way before the alphabetical parade started. After the enactment of the N. I. R. A. it was relatively simple to bring about formal organization of other groups which had not progressed as rapidly.

Today we have a federated association composed of 24 divisional organizations, each dedicated to the welfare of the industry. In the Divisions many outstanding jobs of industry self-government were accomplished in 1934. Although production never rose above 65% during the year, open price warfare and jungle competition were largely avoided. To my mind, this fairly measures the value of organization work. As a result the industry has been able to lift its em-

ployment to the greatest number in its history; it has raised its hourly wage rates almost to the 1929 level; and it has stopped the devastation of its financial resources. I did not expect that the industry would reach a position in 1934 where profits would be possible. Although I expect better business in 1935, I still believe that an adequate return, one that will permit the industry to maintain its heritage of technical and industrial progress which is outstanding in American industrial history, is still two or three years in the future; but I want to emphasize that even though we have not in a single year's operation brought back profits, we have stopped demoralization. In view of the low production levels, what more could be expected?

Back in 1928 and '29 there was a common characterization that seemed to me to be more expressive of industrial conditions than thousands of words of explanation. That characterization was "profitless prosperity". From 1926 to 1929, the heyday of mass production, competitive practices were developing which, aggravated by the lack of volume in 1932, brought the industry to its knees. Price cutting and unfair competitive practices were not uncommon then. Their effect is written clearly in the price declines that occurred between 1926 and 1930. In fact, 1926 was the last reasonably good year in the industry; that is, measured in terms of profits.

I want to emphasize this, because I believe that the extent to which this industry can realize upon the opportunities that lie ahead, and which may develop rapidly as we get back into our expansion stride, demand organization activity. In other words, our organized effort is not merely a means of tiding over bad spells; it is, rather, an essential if the industry is to realize upon its opportunities. Our industry is too much alive, too ambitious; its activities in their larger significance must be governed. Our bit of industrial society must have a leadership that is founded upon the experience and knowledge which organization develops.

In one capacity or another I have been in the paper industry well over forty years. I have observed certain phenomena that emphasize what I have just said. A few of them are illustrative. The ratio of capital investment to annual sales in the paper and pulp industry ranks among the lowest in American industry. Conversely, the amount of overhead per dollar of sales ranks among the highest in American industry. Vain attempts to reduce overhead charges in relation to dollar sales is the most common cause of price demoralization.

Although the price trend of paper and pulp in the last century has been downward in comparison with comparable prices of other commodities and the paper industry during that time has expanded as its products were substituted for the products of other industries, the consumption of paper in any relatively short period cannot be increased materially by price cutting. In its diversified use, paper is essential to modern life. It ranks just below the food industries in this characteristic. Its use is associated with other services and commodities. Its demand is relatively fixed by the extent to which it is used in connection with other services and commodities. Only by new uses can this demand be accelerated, except as the industrial conditions improve. Price cutting has no part in this picture for it simply means a transfer of business from one company to another and a disastrous lowering of prices.

As you know, for many years I was connected with the distribution of paper and I had an opportunity to observe the operations of many manufacturers. I believe I can say truthfully that given capable management, the position of any one company in relation to its competitors does not vary over long periods of time despite industrial conditions. This fact is emphasized in calculations recently made in the paperboard industry, which show that the proportion of each manufacturer's production to the total production of paperboard in the industry has been relatively the same each year since 1927—and this despite years of price cutting and of competitive warfare in which each company tried to the limit of its financial resources to obtain a larger share of the business. Here, as in our own case, the final solution was organized effort. The accomplishments of the Paperboard Industry during the last two years deserves the highest praise.

I want to make one other observation that bears upon our problem as a whole. Permanent retirement of worn out machinery and obsolete equipment is possible only when owned by strong companies. Price warfare does not force the retirement of obsolete equipment; it simply leads to a change in management. I venture to say that one company in the paper and pulp industry has, during the past ten years, voluntarily retired more equipment than has been forced into retirement by all of the competitive warfare during the same period.

Now, I want to summarize what has happened since the last open meeting on October 11, 1934.

At that meeting wage rates constituted our chief discussion. Since then the P. I. A. staff office and counsel, working with a specially appointed subcommittee authorized at the October 11th meeting, have presented new facts concerning the industry to the NRA. As a result the proposed recommendations to increase the minimum rates four cents per hour and to eliminate the 90% clause have been reconsidered. Today we shall discuss the settlement of this dispute with the NRA on a compromise basis. I want to point out that this compromise is a direct result of the industry's organization effort.

In the development of what, for the lack of a better term, we may call permanent NRA policy, the paper and pulp industry together with all industry has been placed on the defensive in respect to price filing procedure. An open hearing on this subject was held in Washington last week. The paper and pulp industry presented a comprehensive statement in support of retaining the open price filing system that we are now using. I believe that I can assure you that the open price filing system that we now use will not be taken away from the paper industry through a blanket Executive Order. If and when changes in our code provisions are to be considered by the NRA, the industry will be given opportunity to be heard. I believe that the paper and pulp industry, which borders closely upon, if not a part of the natural resource industry group, has so many characteristics that are common to that group that our price filing procedure is more apt to be amplified rather than to be restricted. A specially appointed committee by the President, in its report upon a study of conditions in the natural resource industry, has recommended the use wherever feasible of expedients ranging from out and out price fixing to production control and tonnage allocation.

The NRA has notified industry of a labor hearing on January 31st to consider, along lines similar to those laid down in the open price hearing, industry's comments upon shortening the hours of labor, collective bargaining and other major labor issues. Undoubtedly, the paper and pulp industry will present facts in support of its view.

Our organization has, I think, approached a point where harmonizing the activities of the Divisions must be undertaken. As pointed out at the October 11th meeting, the Paper Industry Authority has considered its administrative activities limited chiefly to acting upon appeals, code interpretations and the handling of certain problems that embrace the entire industry, such as labor. The Paper Industry Authority has felt that questions relating to competition were primarily the administrative activities of divisional organizations. In our work experience had to be developed. We now have 24 kinds of experiences—one for each Division, and we have now reached the point where, in my opinion, we can begin a codification of these experiences and upon that basis improve our organization structure.

A start has been made in connection with the application of our trade customs to our code procedure. In common with the rest of the industry I have been disappointed that our trade customs, the product of years of experience, have not been approved by the NRA. I am proud, however, that in spite of this fact there has been a wider general adherence to the recommended trade customs of the Divisions upon a purely voluntary basis during the past year than ever before. We still have incongruities that some companies feel they cannot meet, and we still have companies who wish through non-adherence to obtain what has frequently been referred to in sarcasm as "a fair advantage" to favor their position in their competitive groups.

Other questions that have been raised since our last meeting and questions

that were not fully discussed at that meeting will be brought up during the course of this meeting. Again I want to urge each of you to be free in expressing suggestions and criticisms relating to procedure. In making these comments and criticisms please bear in mind that we are dealing with the industry as a whole.

A final word in conclusion. In stepping out of this picture I want to thank the men and the companies that have stood by me through my six years in office. I want to thank those companies that, back in 1929, loaned money to the American Paper and Pulp Association to attempt then what we have now accomplished. I want to thank the members of the Paper Industry Authority who loaned $5,000 apiece in order that we could get our activities started in 1933. Especially, I want to thank them further for their considerate, sympathetic and wholehearted study of the industry problems that have come before the P. I. A. Few bodies of men could be expected to meet once and frequently twice a month; yet only once have we failed to have a quorum present at our meetings. This alone is significant of the spirit with which the industry has set about realizing upon its opportunities.

I appreciate greatly the assistance given the Paper Industry Authority by the members of the Board of Governors and by the industry members. These men have been patient under trying circumstances, for they recognized the problems that the P. I. A. faced and the necessity that action must be sound and fair.

I want to express particularly my appreciation of the efforts of one group of men in this industry that I think has had more to do with the success we have achieved in our code administration than any other single group of men; the secretaries of the Divisional Associations. Having spent considerable time in the office of the P. I. A., from which activities of all of the Divisions can be observed, I am particularly conscious and appreciative of the efforts that these men and their staffs have made. After all, the secret of success, after policies have been determined, is in administration and I am proud to know that we have personnel in our divisional associations capably handling their duties.

We have been fortunate in our relations with the NRA. Mr. Pickard worked night and day in developing our code, which has turned out to be one of the finest, clear-cut codes in the NRA. Mr. Pickard's administration of it after its approval set the pace, which was followed by Lieut. Tulley and Mr. Lowthorp. Mr. Brown, our present Deputy, is carrying on, and we have evidence of his desire and willingness to cooperate with us in working out our problem.

Just one more word in relation to our Executive Secretary and his office staff. My experience through contacts with different office personnel has given me opportunities of judging ability, loyalty and energy. I have never been associated with any group where these qualities have been shown to such a marked degree, and I feel that the efficient work performed by Mr. Boyce and his loyal staff has contributed greatly to the success of our Association and the P. I. A. and the present high standing of our industry.

Allis-Chalmers Manufacturing Company Holds Open House

On January 20, the Allis-Chalmers Manufacturing Company opened its huge West Allis plant, just out of Milwaukee, to visitors. It was the first time such an event has been staged by the company since its organization in 1901, and Otto H. Falk, chairman of the board, and Max W. Babb, president, assisted by the executive staff, welcomed the visitors and escorted them through the plant.

At the close of the day, it was estimated that 30,000 people had been through the plant. The morning was set apart for employees and their families. In the afternoon the general public was admitted. About 120 representatives of the press, including trade journals and daily papers from Milwaukee, Chicago and surrounding towns, were guests of the company at luncheon.

President Babb told the press representatives that the company's officials felt a definite turn in business had taken place in 1934, and that they are preparing for a year of larger volume. Also, that the prospects for 1935 in the farm equipment line are very bright. This department is making plans for a 50 per cent better volume in 1935 as compared with 1934.

As the visitors filed through the three miles of factories and foundry, they saw machinery and equipment of gigantic size and of vital importance in the operation of the country's industries. There were the mammoth turbines constructed for the Boulder Dam Power Plant. These units are the most powerful turbines that have been made, each capable of developing 150,000 horsepower when the water in the reservoir reaches a maximum head of 592 feet. Each of these turbines can discharge 270,000,000 gallons of water daily which is three times the daily average consumption of the entire city of Milwaukee.

Another example of the wide range of hydraulic equipment built by the company was seen in a small hydroelectric unit sectionalized for airplane transportation. This unit has a capacity of only 460 horsepower and consumes only about one-third million gallons daily under a water fall exceeding 700 feet. This unit will be shipped to a mining camp in Mexico, which is so remote and inaccessible that the machinery must be shipped by airplane, and each piece had to be limited in weight and space suitable for loading in an airplane.

The visitors also saw the huge turbo-alternator unit that has been built for the Milwaukee Electric Railway and Light Company's new Port Washington station. This is an example of the most modern electric generating equipment. The turbine is a tandem compound machine having a rated capacity of 80,000 kilowatts at 85 per cent power factor; the steam end having a capacity of 135,000 horsepower.

The company's Advertising Department, under the direction of A. K. Birch, issued a most attractive booklet which was used as a guide on the trip through the plant. This booklet of 39 pages, was titled "Eighty-Eight Years of Progress" and formed an interesting souvenir of the company's open house and a valuable record of its products and growth.

Quoting from the "Historical" chapter of the booklet: "The Allis-Chalmers Company was organized in the year 1901 through a consolidation of four large manufacturing concerns. These were: The Edward P. Allis Company of Milwaukee, which was recognized as the leading manufacturer of Corliss engines and one of the pioneer builders of modern flour mill and saw mill machinery, as well as of mining machinery; the Fraser and Chalmers Company of Chicago, a leading manufacturer of mining and metallurgical machinery, pumps and air compressors; the Gates Iron Works, Chicago, large manufacturers of rock crushing, cement and mining machinery, and the Dickson Manufacturing Company of Scranton, Pa., important manufacturers of Corliss engines and special machinery.

"Each of these concerns had a long and successful record, that of the Edward P. Allis Company going back to the year 1847 and the Gates Iron Works to 1842.

"In 1904 the new company acquired the Bullock Electric Mfg. Co., of Cincinnati, Ohio, a leading manufacturer of electrical machinery.

"In 1913 the firm name was changed to the Allis-Chalmers Manufacturing Company.

"Other important acquisitions in late years are: Power and Mining Department of Worthington Pump & Machinery Corp., Nordyke & Marmon, Inc., Pittsburgh Transformer Co., Monarch Tractors Corp., LaCrosse Plow Co., Advance-Rumley Corp., American Brown Boveri, Inc., and Condit Electrical Manufacturing Corporation."

Twenty-Second Meeting of Canadian Technical Section

THE Twenty-Second Annual Meeting of the Technical Section of the Canadian Pulp and Paper Association, held in Montreal on January 23, 24 and 25, was marked by a new departure which proved so highly successful that the precedent thus established will doubtless be followed in future. The meeting occupied three whole days; there was a numerous attendance at all the sessions and the animated discussions which followed the presentation of the various papers proved with what interest they were followed.

Following a time-honored custom, the initial session was opened with a brief address by the president of the parent association, Brigadier-General J. B. White, D. S. O. He complimented the Section on the work done during the past year, for which the thanks of the whole industry were due to the Chairman, Committees and members; and the thanks of the Section were due to the Forest Products Laboratories of Canada and to McGill University for their splendid work and co-operation. Unfortunately, adequate funds are not yet available for carrying on the investigatory work as it was felt it should be carried on; but when economic conditions become more stabilized, better financial recognition may be looked for with confidence, as the executives in the industry realize the value of the work under way and the necessity of expanding it, and only present economic conditions have prevented them from furnishing more funds.

Chairman Mitchell's Report

Frank L. Mitchell, Chairman of the Section, presented his annual report and emphasized certain points therein. A wealth of scientific and technical data are being accumulated at the Cellulose Research Institute so fast that it was felt special means should be taken to enable members of the Section to keep pace with the new developments. A series of lectures, extending over three days, was therefore arranged for late last fall, and so great was the response and interest shown by members that there is every likelihood of this being made an annual feature. Facilities which are unexcelled anywhere in the world are available at McGill University for obtaining a Doctor's degree in pulp and paper chemistry; it would be highly desirable, however, that a course in pulp and paper making equipment leading to a Master's degree should be made available in order to better fit graduates in engineering for the positions that are open to them in the industry, and the University has expressed its willingness to organize such a course. With the increasing importance and scope of the work being carried on at the Research Institute, the necessity of having a representative of the Technical Section at the Institute is making itself more keenly felt, and the Section adopted unanimously a resolution recommending to the incoming executives that such a representative be appointed as soon as, in their opinion, funds were available.

The various committee reports, which had already been printed, were taken as read. Carl D. Jentz, Jr., of St. Lawrence Paper Mills Co., presented a paper on "Flash Roasting Pyrite with the Nichols-Freeman System in the Manufacture of Sulphite Pulp," in which he described the construction, operation and performance of the unit at the St. Lawrence mill, Three-Rivers, Que. He was then called upon to answer numerous questions regarding operating details which showed that considerable interest had been aroused. As was to be expected, various difficulties had been encountered, and these had been dealt with and overcome as they had occurred. There is no doubt as to the practicability of the system, this being proved by the fact that, in its present form, it has been operating continuously since last October and has proved as flexible and (it is believed) as efficient as the usual types of sulphur burners in common use in the sulphite pulp industry, and the difficulties that are now being encountered are the same as with sulphur burners. It is worthy of note that one of the troubles that might have been feared when using pyrite; namely, the presence of selenium and arsenic has not materialized. This is attributed to the scrubbing of the gases before absorption, resulting in complete elimination of the selenium, and removal of all but a very small portion of the arsenic.

McInnis Speaker at Wednesday Luncheon

The guest speaker at the luncheon was R. A. McInnis, general manager of Anglo-Canadian Pulp and Paper Mills and a past chairman of the Section, who ventured a glimpse into the future and gave his opinion as to the trends which should be followed and the role the technical man should play in order that the industry may maintain its position in the world markets. He was thanked by L. C. Anderson, of Ontario Paper Co., whose opinions were in agreement with those of Mr. McInnis. John Stadler added a few remarks, saying that, while technicians undoubtedly had done truly remarkable work in reducing production costs and improving the efficiency of operations in the mills, perhaps too little attention had been paid to the marketing of the product which had been manufactured with so much care, and in his own inimitable, semi-humorous, semi-serious manner, he suggested that possibly the next step which should be taken would be the formation of a Marketing Section of the Association.

The Use of White Water

In the Fine Paper Industry—On resumption of the Sessions, Dr. G. I. Hoover, of Provincial Paper, Ltd., presented a most interesting paper on "The Use of White Water in the Fine Paper Industry," in which he discussed the principles underlying the use of fourdrinier paper machine white water in the fine paper industry, with particular reference to operating conditions as they exist in Canada. Commenting on this paper, Mr. Candee considered that Dr. Hoover's systematic approach of the subject by a study of consistencies, dilutions and pH's at various judiciously selected points in the system was the most consistent and rational method of tackling the problem. He emphasized that reduction in the size of the recovery equipment, as could readily be done with the system recommended by Dr. Hoover, not only made for greater cleanliness, but also greatly facilitated operations in mills running small orders and consequently obliged to make numerous grade changes on their machines.

A. E. H. Fair, of Alliance Paper Mills, did not fully agree with Dr. Hoover's opinion that decker type savealls had no place in a fine paper mill. Whatever kind of recovery equipment is installed in a mill, it is important to understand its limitations; in many cases decker type savealls are not being run to the best advantages through lack of appreciation of this very important fact. The machine can be made to handle satisfactorily either a free or a slow stock, provided a proper mat is built up, but this is absolutely essential.

In the Newsprint Mill—In conclusion, R. W. Sterns, of Abitibi Power and Paper Co., presented his views on "The Use of White Water in the Newsprint Mill," and showed that, while reduction of the use of fresh water appears at first sight the simplest and easiest way of reducing or eliminating losses of paper making materials in the white water, the matter is by no means as simple as it might at first seem, which doubtless accounts for the greater popularity of the other alternative of clarifying the white water effluent.

Paper Machine Wet End Design Problems

The last paper of the day was by J. B. Gough, of Price Bros. and Co., who gave a purely theoretical discussion of the "Relative Location of Breast Roll, Slice and Apron, With Some Notes on the Related Problems of the Flow Box and Pond Height." This precipitated

a most animated discussion which centered to a considerable extent around the relative directions and speeds of the wire and stock at the point where the two come into contact with each other. Finally, John Stadler put forth the opinion that, when the stock and wire have different speeds, not only does this eliminate air bubbles, but it also produces a shaking effect similar to that produced by a skilled vat man making hand papers. The whole problem, however, cannot be definitely settled until basic knowledge is obtained by measurements made in the course of actual paper making operations (not merely in laboratory experiments), and at present there are no slices in Canada which have the required adjustment facilities for carrying out such work.

New Officers

In view of the fact that subsequent sessions had quite a heavy program, officers for 1935 were immediately elected as follows: Chairman: W. S. Kidd, E. B. Eddy Co., Hull, Que. Councillors: J. G. Lane, Canadian International Paper Co.; T. M. Barry, Fraser Papers, Ltd., and G. I. Hoover, Provincial Paper Co.

Chemipulp System Discussed

Thursday morning was taken up by the presentation and discussion of two papers contributed by members of the staff of Ontario Paper Co., who described two very recent developments in the industry, as actually carried out in the course of commercial operations at the Thorold mill. J. B. Jones first described the operation of the Chemipulp System with Precirculation of Hot Liquor. In reply to a question, he stated that he was not prepared to state that increased yield noted was due only to precirculation, as it was observed only about six months after precirculation was adopted. E. M. Little, of Anglo-Canadian Pulp and Paper Mills, Ltd., Quebec, where the same system is installed as at Ontario Paper, stated that they derived the following benefits from precirculation: increased yield, improved uniformity in pulp quality, lower screenings, lower steam and sulphur consumptions. Under conditions prevailing at the Anglo mill, the increase in yield was maximum with a time of precirculation of about two and a half hours.

R. A. McInnis considered that procedures prevailing at present for obtaining pulp yields are practically little more than guesses, the pulp production being calculated from the wood input by means of a factor depending on mill conditions, or else the wood consumption is estimated from the quantity of pulp produced. He suggested the advisability of the Section undertaking the study of yield determination, with a view to working out a standard method that could be relied upon to give accurate results. L. C. Anderson explained that at the Ontario Paper Mill they had been placed in exceptionally fortunate circumstances in that, starting at a time when the wood pile contained less than 1000 cords, practically all wood received over an extended period had been measured, while chips to the digesters had been weighed on the weightometer and wood for the grinders had been racked. At the end of the period in question, with about the same amount of wood in the block pile as at the start, and having handled some 200,000 cords, it was found that the monthly averages of the two sets of figures agreed within about 1 per cent, showing that the procedure described in Mr. Jones' paper furnished a reliable method for determining yield.

John Stadler remarked it is practically impossible to get a really accurate wood measurement on account of the multiplicity and complexity of factors involved. It is possible to get results which are of practical value, but he warned against going to excessive refinements, as this would defeat its own end.

High Speed Grinding Studies

H. B. McAdam and L. C. Anderson described the "Extension of High Speed Grinding Studies to Semi-Commercial Scale," this being an application in mill operation of the study initiated at the Forest Products Laboratories of Canada by Dr. H. W. Johnston; and samples of newsprint made from groundwood produced by high-speed grinding were circulated in the audience. L. Kendall, of the Gatineau mill of Canadian International Paper Co., remarked that the paper that had been passed around undoubtedly proved the feasibility of high-speed grinding. He regretted, however, that it was practically impossible to compare the quality of this groundwood with that of other Canadian mills; and at the suggestion of the Chairman and of Dr. Johnston, Mr. Anderson promised to send some of the pulp to the Research Institute, so that it could be tested and compared with the pulps of other mills that had been previously tested.

C. C. Heritage Extends Greetings

At the request of Chairman F. L. Mitchell, C. C. Heritage, President of T. A. P. P. I, briefly addressed the meeting. He brought the greetings of his organization to the Canadian Technical Section and extended a cordial invitation to attend the T. A. P. P. I. annual meeting in New York next month, assuring the members that a very warm welcome awaited them.

Joint Sessions of Technical and Woodlands Sections

The Thursday luncheon was a joint one for the Technical and Woodlands Sections. At Mr. Mitchell's invitation, Brigadier-General White, president of the Canadian Pulp and Paper Association, introduced the guest speaker, E. W. Beatty, president of the Canadian Pacific Railways and Chancellor of McGill University, who advocated still more intensive research and urged the industry to avail itself to a greater extent than heretofore of the facilities of the Cellulose Research Institute.

The after-dinner session, a joint one of the Technical and Woodlands Sections, was held in the hotel. Four papers were presented, all by Woodlands men. They were: "Pulpwood Costs in Woods and Mills Operations," by W. G. Wright of Price Bros. and Co.; "Logging Jack Pine," by W. A. Delahey of Canadian International Paper Co.; "Dirt in Wood," by W. A. E. Pepler and R. G. Belcher, both of Canadian International Paper Co.; and a "Preliminary Report on Study of Pulpwood Properties as Related to Growth Conditions," by J. D. Hale of the Forest Products Laboratories of Canada, Ottawa.

The ensuing discussions were lively and instructive and brought out numerous interesting points. The value and advisability of such joint sessions, which had been inaugurated last year, was once more very clearly demonstrated, and the suggestion was made that next year it might be extended to a full day instead of half a day.

Cellulose Research Institute Activities

The last day of the meeting was devoted to work being done at the Cellulose Research Institute. Owing to the inevitable absence of Mr. Mitchell, who attended the meeting of the parent association, Dr. H. J. Rowley, of Anglo-Canadian Pulp and Paper Mills, presided.

In view of the fact that recent work on the structure of cellulose had been gone into pretty thoroughly in the course of the lectures which had been given at the Research Institute for members of the Section last November, Dr. Hibbert considered it preferable to deal with lignin instead of cellulose, as had been announced. He, therefore, gave an explanation of the nature and purpose of the comprehensive lignin researches being carried out under his direction at the Institute. He briefly outlined present day knowledge of the syntheses of plant metabolism, showing that the mechanism of the formation of starch and cellulose is fairly well established, while it reasonably could be inferred from the most recent results obtained at the Research Institute that lignin is built up from uronic acid and furane derivatives. Dr. Brauns followed with a survey of his own work on the structure of lignin, carried on for the last three and a half years under Dr. Hibbert's direction. In the last paper of the group, Dr. Tomlinson described a most interesting piece of research which was made possible by a special grant from Howard Smith Paper Mills. The most noteworthy feature of the work is that, for the first time, a well defined chemical entity of commercial value, vanillin, has been obtained from sulphite waste liquor in yields of the order of 2 to 3 grams per liter.

Dr. H. W. Johnston and Dr. O. Maass presented some "Fundamental Aspects of Power Consumption in Grinding," this being in the nature of a progress report giving the present status of the investigation undertaken some time ago at the request of the Groundwood Committee. In the course of the ensuing discussion, Dr. Johnston explained that they were hampered by the fact that a

thorough and systematic study of all factors necessitated many tests, and these are expensive when carried out on the grinder at the Research Institute; and also that it is very difficult (not to say impossible) to be even reasonably certain that wood quality is uniform throughout a whole test. Hence, they are at present building a miniature grinder in which the actual grinding area will be about 2 square inches and with which it will be easy to carry out numerous tests under strictly controlled conditions. As John Stadler remarked, such an instrument should give much interesting and valuable information, provided there are instruments for accurately measuring power input of such a small machine.

Extending his widely known studies on hydration, Dr. Boyd Campbell presented a paper on "Fibre Structure and Its Influence in Paper Making," in which he described the essential elements of fibre structure and indicated how they operate in the paper making process. Dr. Campbell's work and theories have been attracting considerable attention both here and abroad, and the views on the mechanism of hydration which he is developing so consistently are daily gaining favor.

This highly successful meeting was brought to a conclusion by the presentation of "New Developments in Lignin Removal Studies" by Dr. F. H. Yorston, who made a progress report on fundamental studies on this subject, undertaken quite recently at the request of the Sulphite Committee.

At the annual meeting of the parent association, which was held on Friday, January 25th, Brigadier-General White was unanimously re-elected president for 1935.

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◆ Wood Pulp Industry in Germany

According to information published by the Bureau of Foreign and Domestic Commerce, a significant change has taken place in the German wood pulp industry within the last 9 months, according to a recent report from W. S. Jesien, American Consulate General, Frankfort. Leading German wood pulp concerns in 1933 were wrestling with business difficulties with some threatened with insolvency. A prominent concern the previous year had had to reduce its capital stock in order to patch up shattering losses. The firm mentioned is now considering resumption of dividend payments, and there has been a noticeable upward trend in wood pulp stocks in general. Although much secrecy surrounded the transactions of the international sulphite cartel at its meeting in Stockholm in September, it is now generally understood that production quotas were raised to 75 per cent of digester capacity as against 70 per cent. The German group was among the most intensely interested in greater freedom of action, and it is currently reported that German exports of sulphite pulp were released from cartel restrictions.

Germany's exports of sulphite pulp have been increasing steadily during the current year, as compared with the corresponding period in 1933, every succeeding quarter showing a higher rate of improvement. Thus the total for the first quarter exceeded that of the corresponding 3 months in 1933 by 29 per cent. The second quarter's total showed an increase of 32 per cent, and the third quarter of 38 per cent. German exports of sulphite pulp for the first 9 months of the current year are reported to have totaled 237,399 metric tons (metric ton = 2,205 pounds) as against 178,911 during the corresponding period in 1933.

The United States was the leading purchaser of German sulphite pulp during this period, taking a total of 67,374 tons, an excess of 25 per cent over its 1933 purchases. Of the other important markets, France increased its purchases by 22½ per cent; the United Kingdom by 58 per cent; while Italy doubled and Spain nearly trebled its purchases.

The German domestic market has also contributed in a large measure to the favorable position of the industry this year. While production of paper is still under normal, according to latest reports, the outlets for wood pulp in the rayon and synthetic plastics industries have undergone notable expansion.

Conditions in the German paper industry have shown little change during the past few months. The prices of straw continue to increase in view of the insufficient supply. Many branches of the industry report increased difficulties in obtaining sufficient pulpwood, offers of domestic wood having diminished, while foreign wood is hard to obtain because of exchange restrictions.

Steam Leak Calculations

By O. K. Graef

SMALL jets of steam issuing from damaged or worn steam valves and fittings, worn steam-fits on a paper machine, damaged steam traps or from pet-cocks left partially open on steam traps introduce very appreciable losses into the heat balance of a mill.

Steam will flow from a higher to a lower pressure at a constant rate until a point is reached where the lower pressure is about 58 per cent of the higher. This point is reached when steam is discharged into the atmosphere at about 25.4 pounds absolute. Thus for any pressure less than 25.4 pounds absolute, the pressure of the atmosphere (14.7 pounds per square inch) is greater than 58 per cent of the initial pressure and the flow is at a constant rate. Above this pressure the velocity, and hence the quantity, increases with increasing pressure differentials.

For pressures higher than 25.4 pounds absolute, calculations of the outflow of steam to the atmosphere may be made through the use of Napiers empirical formula. This formula, which is accurate to within 3 or 4 per cent, may be expressed as

$$W = \frac{PA}{70}$$

Where W = Pounds of steam flowing per second.
P = Absolute pressure in pounds per sq. in.
A = Area of orifice in square inches.

For flows through a pipe or orifice where the lower pressure is greater than 58 per cent of the higher, the following formula applies:

$$W = 1.9\ C\ A \sqrt{(P - p)\ p}$$

Where W = Pounds of steam flowing per minute.
C = A constant = 0.93 for a short pipe.
= 0.63 for a hole or orifice in thin plate.
A = Area of orifice in square inches.
P = Absolute initial pressure in pounds per square in.
p = Difference in pressure between the high and low sides in pounds per square inch.

◆ Lignin a Product of Wood Baffles Chemists

"After nearly one hundred years of investigations by eminent chemists lignin, a substance found in all forest trees remains a chemical mystery as to its structure and yet it is one of the largest chemical by-products to be found in the forest," says Dr. Louis E. Wise, Professor Emeritus of the New York State College of Forestry, Syracuse, N. Y.

Dr. Wise further states that twenty to thirty per cent of dry wood is composed of lignin. It is also found extensively in agricultural crops and the combined losses in lignin waste from pulp mills and argicultural products is conservatively estimated to be forty million tons annually. The lignin molecule is so strangely constituted chemically that it still presents a challenge to the chemist, yet it has chemical properties that point strongly toward its industrial usefulness. What is it chemically? By what complex mechanism is it produced in forest and field? What use can be made of it? How should the waste be disposed of? These questions have probed the heart of the lignin mystery in a futile effort to disclose its secrets.

If its structure could be discovered, it might open a vast new field of wood utility, the same as with its neighboring constituent of wood cellulose which now in one form or another enters into paper, rayon, cellophane, textiles, explosives, lacquer and photographic materials. Only a few uses have as yet been discovered for lignin waste but they are only a fractional part of the total. It is the belief of those interested in the chemistry of wood that the time will come when the lignin mystery will be solved to the benefit of humanity.

Paper Industry Now in Best Position Since 1930

The information on this page is quoted from a survey of the paper industry recently published by DUN & BRADSTREET, INC.—*Editor's Note.*

THE improvement which started in the paper industry in 1933 was extended and amplified during 1934. Influenced by the changed industrial conditions, production and distribution were substantially in excess of the volume recorded for the year preceding, in spite of numerous interruptions to progress, particularly during the third quarter. With the trend in both of these divisions now strongly upward, a long step toward complete recovery is expected to be made during 1934, as overproduction and price-cutting appear to have been brought definitely to an end, and the year has opened with cheerfulness more widespread than at any time since 1928.

With the distance covered since the all-time low levels were touched in 1932 estimated at 30 to 40 per cent, profits are becoming more general and some firms were out of the red in 1934 for the first time since 1930. Stabilized prices under code regulations were factors which strengthened profit margins, while other favorable conditions were reduced credit losses and a general improvement in collections. The leading paper mills throughout the country showed a steady improvement during 1934, with employment fairly good in most districts, and general pay rolls the highest since 1931. Most of the factories are starting the new year with low warehouse stocks and well-filled order files, and with demand expanding for nearly all grades produced.

Schedules Set Higher

Production at most mills showed a substantial increase during the past twelve months. This has been evidenced definitely by the fact that many mills of late have found it difficult to give their usual prompt service. At present, some mills are from ten to fifteen days behind in filling orders. While a part of this may be attributed to reduced working forces, the situation largely has been caused by the rapid increase in orders, particularly since early Fall.

Production in some divisions did not equal that of 1933, due to the fact that during the latter part of that year codes were going into effect and buying was exceptionally heavy, and retailers accumulated substantial inventories which had to be worked off during the opening months of 1934. While operating schedules currently are higher than at the beginning of 1934, production is expected to follow an irregular inclining trend during the first and second quarters, with a sharp expansion in prospect for the last half of the year, at which time some new peaks may be recorded for many branches of the industry.

During every month in 1934 production of newsprint was in excess of that for the comparative 1933 period. With the largest gain in the history of the industry, output of Canadian mills in December reached 239,544 tons, or an increase of 36.6 per cent over the December, 1933, figures, which was attributed to the stocking by customers that wished to secure as much paper as possible before the $2.50 a ton price advance started on January 1. This gave a total production of newsprint in December for the United States and Canada of 608,710 tons, or a gain of 24.6 per cent, when compared with that of a year ago. With the December gain, newsprint production for both countries for 1934 was lifted to 3,561,662 tons, as compared with 2,952,952 tons in 1933, which was an increase of 20.6 per cent, and represented the largest total recorded since 1930, when 3,786,519 tons were produced.

Sales Totals Lifted

In spite of the rather abrupt recession in demand during the third quarter, sales of paper for 1934, as a whole, were 15 to 25 per cent larger than in 1933 from a volume standpoint. The largest gain was reported for business letterheads, envelopes, book, tissue, wrapping, and printing papers, and newsprint. During the last three months business has been unusually brisk in paper bags and wrapping paper, as sales with users of these items were far in excess of those of a year ago. With the improvement of general business, the tendency has been for buyers of paper to go back to the better qualities. Price no longer is the controlling factor, and quality and real value rapidly are coming back into their own.

The exceptionally good holiday trade benefited the specialties branch particularly, and replacement orders have been substantial, as stocks practically were depleted at the end of the year. Inventories of fine papers also are low, due to the insistent demand during the final quarter of 1934, and there has been a strong upturn recently in the orders for bonds, ledgers, and the papers used for advertising campaigns, which now are getting under way after many postponements during the last two years.

Price Structure Firm

Through the operation of the code and the decrease of cut-price practices, quotations have been standardized, to some extent, although not at a high level. Since the adjustments effected early in the Summer of 1934, prices have continued firm at a level about 8 to 12 per cent above those for the comparative period of 1933, with any alterations made in the near future expected to be in an upward direction.

After holding firm at $40 a ton since April, 1933, when it was reduced from $45, the price of newsprint was advanced on January to $42.50 a ton. The latter figure is to apply during the first six months of the current year, with an advance of not more than $2.50 to become effective for the second half of 1935.

Both wholesale and retail collections are reported to have been considerably better during 1934 than in 1933, with the gain ranging from 20 to 30 per cent, due largely to the codes, which prohibit the extension of credit when bills are not paid within ninety days. The unsatisfactory financial condition of many printing concerns has made collections difficult in this line, and it has been necessary to hold customers to cash terms in many instances. Collections on current sales continue good, with further reductions being made in old indebtedness.

Failure Losses Halved

Although the number of failures in the paper industry during 1934 was the smallest recorded since 1931, the total of 24 was only 2 less than in 1933. The reduction was in the manufacturing division, as for paper wholesalers and retailers there were 16 bankruptcies listed, the same as in 1933.

In the defaulted indebtedness, however, a sharp reduction occurred. As against a money loss of $2,464,929, which the 26 failures caused the industry in 1933, the involved liabilities of the 24 insolvencies in 1934 were cut to $1,224,807, a drop of $1,249,142, or 50.3 per cent. Although not quite so pronounced as during the year preceding, particularly as to the number of bankruptcies, there has been a continuation of the favorable showing of 1933, when total failures fell to 26 from 44 in 1932, a decline of 40.9 per cent, while the dollar loss was reduced to $2,464,749 from the record high of $3,647,797 in 1932, a decline of $1,182,848, or 32.4 per cent.

The complete insolvency record of the paper industry since 1927, including the entire twelve months of 1934, as compiled by DUN & BRADSTREET, INC., shows:

Paper Manufacturers

Year	Number	Liabilities
1927	5	$2,017,000
1928	5	816,900
1929	10	1,929,200
1930	3	821,226
1931	1	800,000
1932	9	2,613,450
1933	10	1,944,189
1934	8	892,529

Combustion Control Equipment

By R. H. Bacon

IN order to obtain complete automatic combustion control, the machinery which must be governed consists of the forced-draft fan supplying air under the fire, with which is included the butterfly gates in the air ducts; the stoker or other device feeding fuel; and the damper or induced-draft fan in the boiler breeching which controls the draft over the fire.

Air supply is controlled by the forced-draft fan which, in turn, is driven by an engine or motor. It can thus be governed by regulators placed upon the steam line to the engine, or in the electric circuit of the motor. It is possible to govern the air supply so that it will be proportional to the amount of fuel supplied, or so that a certain draft over the fire will always be carried, or so that a certain steam pressure will be maintained. By the principle of direct action, control of the air supply should be directly from the steam pressure.

Probably the most satisfactory way to handle the butterfly gates in individual air ducts is to determine by a little experimenting what average setting on each boiler is right to enable each boiler to take its share of the plant load from no load to full load. If the gates are set in the best position and left there, each boiler will take its share of the plant load at all times without any tendency to shift.

Where forced draft is employed, the damper or induced-draft fan is the apparatus which determines the draft over the fire. The damper may be mechanically operated or motor operated. Induced-draft fans may be driven by engines or motors in which case the regulator is connected to the steam line of the engine or the circuit of the motor. The damper or induced-draft fan may be used to maintain constant steam pressure to control combustion for greater economy.

Steam pressure can, however, be changed much more quickly by changing the amount of air supplied under the fire than it can by changing the damper position, particularly if the air supply is controlled directly from the steam pressure. Economy of combustion is controlled by the damper by keeping the draft over the fire constant at a low figure and direct action is obtained by governing the damper directly from the draft over the fire itself. As the amount of gases in the combustion chamber increases with increased air supply and fuel feed, the draft over the fire tends to decrease, and this decrease operates the regulator to open the damper and release the gases.

In a group of boilers, direct control of each damper from the draft over the fire in the boiler to which it is attached has a decided advantage over any form of control which governs all dampers alike regardless of load on the individual boiler. There is no runaway characteristic to be considered here and opening or closing the damper affects only the economy of the boiler, not its operation.

Change in the fuel feed or air supply affects the load which the boiler carries and the steam pressure but does not affect the economy of combustion, if the damper is governed from the draft over the fire. The economies due to automatic combustion control are almost all affected by the damper regulator, although automatic fuel feed saves something by making the feeding of the fuel regular.

In the majority of plants using forced draft, fuel feed is obtained by using a mechanical stoker operated by an engine or a motor. Regulators can be applied either to the steam line supplying the engine or to the electric circuit of the motor.

Controlling the fuel feed from the steam pressure or from the forced-draft fan gives a reasonably satisfactory method of working. Either of these has the advantage that increase or decrease in the fuel feed is directly correlated with similar changes in the air supply and there is less danger of improper quantities of air being supplied the fire than when the stoker is not linked with the forced draft fan or governed from the same control factor.

◆ Earl Grant Made Vice President of Crystal Tissue

Earl E. Grant, director of personnel of The Crystal Tissue Company, Middletown, Ohio, was elected vice president and appointed on the Board of Directors at the annual meeting of the company in January.

Mr. Grant became associated with the company in 1921, having charge of the mill stores. He has since been through the cost and employment departments. He will continue his present work along with the new duties.

◆ ANNOUNCEMENT is made of the resignation of W. A. Munro as manager of the Munising Paper Co., Munising, Mich. Mr. Munro's successor has not been appointed.

◆ RALPH H. CLORE has been appointed general sales manager of The Medart Company, St. Louis, Mo. Mr. Clore was formerly general sales manager of the United States Electrical Tool Company. He succeeds F. P. Kohlbry, who has resigned to assume charge of the Machinery and Welder Corp., Chicago.

◆ SAWDUST when treated with phenol by a process under development at the Forest Products Laboratory, Madison, Wis., is capable of being pressed into smooth, hard sheets or moulded shapes of dense and uniform structure. It is believed that material can be produced from sawdust that will meet demands for a plastic of wide utility and low cost. Further experimental work to this end is under way.

◆ Arthur D. Little Made Chairman of Board

At the recent annual meeting of the stockholders and directors of Arthur D. Little, Inc., Arthur D. Little retired as president and was elected chairman of the board. Earl P. Stevenson, who has been with the organization since 1919 and vice president since 1922, was elected president, and Roger C. Griffin, a member of the staff since 1909, was elected treasurer. Raymond Stevens continues as vice president.

The following Board of Directors was elected: Carl P. Dennett, W. Cameron Forbes, Horace S. Ford, Randolph C. Grew, Roger C. Griffin, Arthur D. Little, Royal Little, Henry A. Morss, Henry G. Powning, Earl P. Stevenson, Robert G. Stone, Alexander Whiteside.

Dr. Little becomes chairman of his well-known Cambridge scientific organization within a year of its fiftieth anniversary. His staff now includes graduates of twenty-two universities and technical schools, with eleven graduates of Massachusetts Institute of Technology alone.

◆ FOOTE BROS. GEAR AND MACHINE CO., Chicago, announce the appointment of C. A. Hayward as sales and engineering representative for IXL Speed Reducers and gearing in the Detroit territory, with headquarters at 7310 Woodward Ave.

◆ CHENEY PULP AND PAPER CO., Franklin, Ohio, announces that Edward H. Bindley has become affiliated with the company as assistant to Mr. Cheney.

◆ Reduction of Noises Increases Efficiency

Noise is accepted by the majority of persons without much protest even though they are more or less conscious of its unpleasant or harmful effects.

Improvement has followed a reduction in noise in work places. When the noise level was reduced from 45 decibels to 35 among a group of workers in an insurance office who were engaged in a variety of machine operations, a 12 per cent increase in output followed the reduction in the noise intensity.

Moving the assembly department of a temperature-regulator company from next a boiler shop to a quieter room resulted in a reduction of rejections at inspection from 75 per cent to 7 per cent, while in the same department the output increased from 80 to 110 assembled units per unit of time.

In another department a 12 per cent increase in output resulted from removing the noise of a large ventilating fan.

Lowering the noise level from 50 decibels to 35 decibels in the telephone operating room of a telegraph company resulted in a 42 per cent reduction in errors and a 3 per cent reduction in the cost per message.

These figures do not take into account the gain to the workers themselves from the relief following the improved noise conditions.—From *Industrial Standardization*—Jan., 1935.

◆ Paper Excelsior Shredder

A new type of paper excelsior shredder has been developed and placed on the market by Mitts & Merrill, Inc., of Saginaw, Michigan.

This shredder, designated as the Airfluff paper excelsior shredder, is designed on a principle very similar to that of an ordinary paper cutter. A heavy disc carries three knives which

cut against a stationary knife located in the frame of the machine. The material being shredded is fed to the machine by means of a pair of rollers similar to those on an ordinary washing machine wringer.

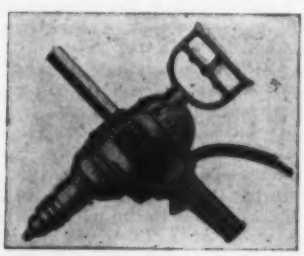
The standard machine is arranged to cut widths from ⅛ inch to ⅜ inch, but narrower or wider widths can be cut, if desired, through the use of special gearing.

The rated capacity of the machine ranges from 400 lb. per hour of ⅛-inch wide excelsior to 1,200 lb. per hour of ⅜-inch excelsior.

More detailed information about the shredder will be furnished by the manufacturer upon request.

◆ Portable Electric Drill

A new one-half inch standard duty portable electric drill has been announced by Signal Electric Mfg. Co. of Menominee, Mich. The drill has a breast plate type handle with detachable pipe



handle; a trigger type switch with lock for continuous operation; and comes equipped with 12 feet of heavy duty rubber covered cord with rubber plug. Its overall length is 16½ inches; its net weight, 14 pounds; and its no load speed, 420 r.p.m.

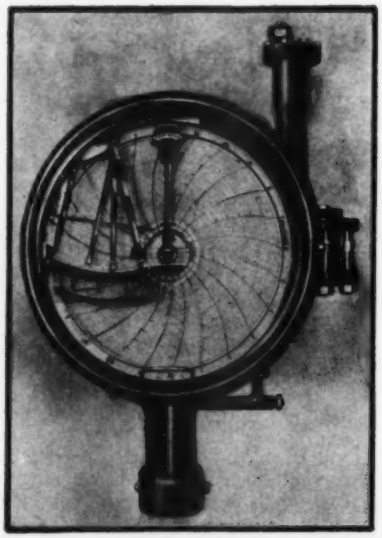
◆ Universal Meter

A meter designed to measure steam, oil, air, water, gas, acids or any other fluid under any industrial condition is the latest addition to the complete line of meters manufactured and sold by The Foxboro Company of Foxboro, Mass.

This new measuring instrument has a flow rangeability of ten to one. Where it is necessary or desirable, temperature and pressure records may be recorded on the same chart with the flow. When a multiplepen recorder is furnished, all pens move about the same center of rotation and will not interfere with each other at any point in their travel.

A new mechanical integrator has been built especially for this meter. This integrator shows the total flow on an easily read counter. A recording pen can be added which makes a mark on the chart rim when the integrator adds a given amount to its count.

The meter is protected from overrange flows or incorrect manifold valve manipulation by standard Foxboro check valves. These float type valves are posi-



tive in operation—full line pressure may be applied to either mercury chamber with the other side open to atmosphere and not one drop of mercury will be blown out. Neither will the line fluid bubble through the mercury and result in emulsification.

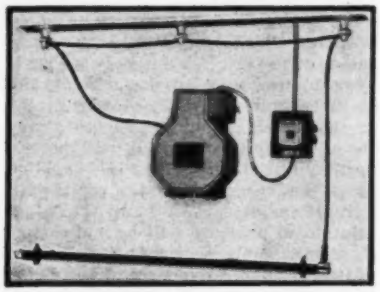
In addition to the recording and integrating feature, the universal meter can be furnished with a transparent indicating scale that makes it possible for the flow to be read at a glance.

◆ Static Neutralizer for Paper

A static neutralizer, designated as the Chapman electric neutralizer, is a product of the U. P. M.-Kidder Press Company of Dover, N. H.

This device, claimed to remove static electricity from any kind of industrial machine or process in which it can be applied, consists of a power unit suitably connected to one or more inductor bars. With alternating current, the neutralizer needs only a transformer for stepping up the supply voltage to 12,000 volts—at the same time stepping down the current to 1-100th of an ampere or less, thus making it absolutely safe. With direct current, an inverted rotary converter or alternator driven by direct current or belt from mechanical power is used.

One terminal of the high tension coil is connected to the ground, the other to a well-insulated cable leading to the



various machines. This cable is then connected to one or more inductor bars through the use of flexible cable and removable sockets.

It is said that this device requires little more current than is consumed by an ordinary light bulb. Furthermore, it is claimed that it prevents dust from sticking to paper as it is rolled up; that it makes sheets deliver in even piles at any speed; that it prevents sparks marking surface of paper; and that it makes possible an increase in the production speed of paper bags, envelopes, paper napkins, printed dress patterns, etc.

◆ Portable Potentiometer

The Brown Instrument Company, Philadelphia, has announced a new portable potentiometer. The potentiometer circuit of this instrument has been designed primarily for checking pyrom-

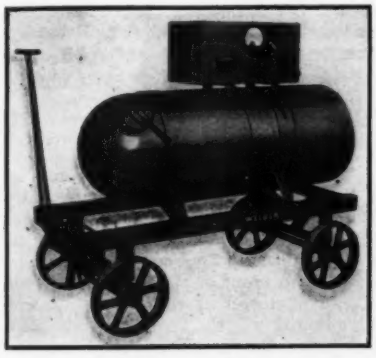
eters and thermocouples. In addition, this new portable potentiometer can be used as a measured source of E.M.F. in checking recording potentiometers of the self-balancing type. The circuit draws only three milliamperes from the

dry cell, giving the dry cell a life of several months and permitting the instrument to be used for several hours on one standardization of the battery current.

In addition to being simple in construction and extremely accurate, this new Brown portable potentiometer is small in size and light in weight. It is 9⅜ inches wide by 10¼ inches deep by 6¾ inches high, and weighs only 12¾ lb.

◆ Alternating Current Welder

The Lincoln Electric Company, Cleveland, Ohio, has announced a new alternating current welder which will be known as the Lincoln "Shield Arc AC." This new welder is of the motor generator type which takes 2-phase or 3-phase alternating current of standard voltages and frequencies and converts it into alternating current of lower voltage and at that higher frequency most suitable for arc welding with either heavily coated or washed electrodes in all positions.



The welder is built in portable and stationary AC motor driven models and in two sizes. The smaller capacity machine can be used for continuous welding with electrodes of 3/32 inch to 5/16 inch in size; the larger capacity welder handles electrodes from ⅛ inch to ⅜ inch in size. These machines are wired for 220, 440 or 550 volts, AC supply, 2 or 3-phase, 50 and 60 cycles.

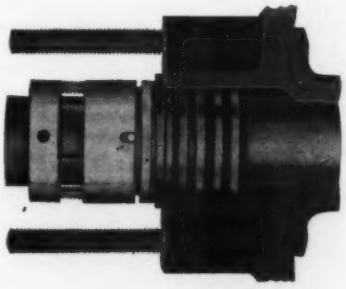
◆ Pneumatic Impact Wrench

Ingersoll-Rand Company, 11 Broadway, New York City, has placed upon the market a new pneumatic tool which, it is claimed, will spin down a 1-inch or larger nut at 700 r. p. m. and then give it a series of smart torsional blows at the rate of 1,400 a minute to tighten it as securely as desired. This tool, weighing only about 20 pounds, is designated as the Ingersoll-Rand Pott impact wrench. The wrench is suggested for application wherever considerable nut running, whether applying or removing, is done.

◆ Rotating Shaft Packing

The Durametallic Corporation, 2107 Factory Street, Kalamazoo, Michigan, has announced a new type of mechanical seal. This seal, known as Dura Seal, has been developed for use on centrifugal and rotary pumps or other similar equipment and is designed so that it can be applied to ordinary stuffing boxes.

An assembly in which the member rotating with the shaft, or Dura Seal proper, is placed entirely within the stuffing box and revolves against the faced off gland or special stationary bushing is recommended by the manu-

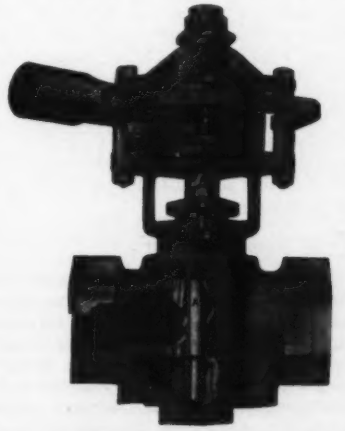


facturer for use on higher pressures; while an outside assembly in which the seal ring rotates against the gland faced off and reversed or against a special bushing extending into the stuffing box with its outer face lapped in against the seal ring of the rotating member is recommended for pressures up to 60 pounds.

The manufacturer claims that this seal has proved itself efficient over considerable periods of time on overhung impeller stock pumps, bleach pumps, white water pumps, and pumps for other liquids as well as on pumps that are handling gritty or dirty water.

◆ New Plug Valve

A lever operated plug valve, designated as a Thru-Flow valve, has been developed by the Golden-Anderson Valve Specialty Co. of Pittsburgh, Pa. The valve, furnished in two-way, three-way and four-way designs of bronze, iron, steel or other metals according to serv-



ice conditions and requirements, is available in screwed and flanged ends in ½-inch sizes and larger for all service pressures. It may also be furnished to operate with handwheel as well as equipped for automatic operation in the larger sizes with suitable control cylinder and pilot valve mechanisms. The valve is especially designed to always axially unseat each time before plus valve is rotated to either open or closed position, and it is suggested that the valve can be quickly and easily adjusted from the outside for any clearance of .01 to .06 of an inch and that it requires no lubrication or special attention for any service conditions.

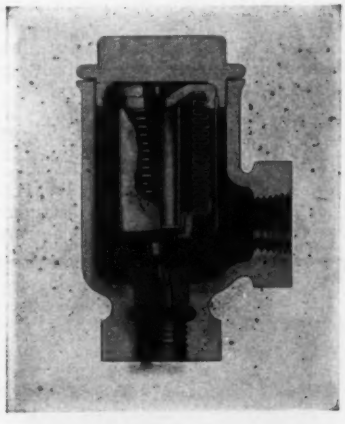
◆ Feed Water Flow and Boiler Water Level

A new meter to indicate and record both boiler water level and feed water flow has been developed by Bailey Meter Company, Cleveland, Ohio, for use in boiler plants where it is desired to have both an indication and record of these factors on the operating floor.

This combination meter consists of a standard Bailey fluid meter which indicates, records and integrates feed water flow and a 12-inch indicator with a dial type scale for boiler water level. The indicator is mounted directly above the recording meter on a small feed water panel.

◆ Thermostatic Steam Trap

A thermostatic steam trap designed to handle steady and fluctuating pressure from 0 to 200 lb. and made in ½ in., ¾ in. and 1 in. sizes, has been placed upon the market by the Sarco Company, Inc., 183 Madison Avenue, New York



City. The thermostatic bellows of the trap is made from helically corrugated heavy-walled tubing with special caps being utilized for both top and bottom. A shield protects the element over its entire length, against the abrasive action of the steam. It also permits the element to be removed from the trap body while hot if desired.

The body and trap cap are of heavy cast bronze while the valve head and seat are of stainless steel.

◆ Small Electric Melting Furnace

An electric melting furnace with a cold charge capacity of 35 lb. and a molten capacity of 80 lb. has been announced by the Detroit Electric Furnace Company of Detroit, Michigan.

This new unit, designated as Type GM, has been engineered to increase the angle of rock of the furnace shell automati-

cally. A feature of the rocking mechanism is that the shell velocity is zero at the point of reversal. The shell is timed by a gear to the reversing mechanism.

The furnace, equipped with a special transformer and control panel, is lined with a special high temperature refractory. The electrode clamps are water cooled; and an oval shaped door is used instead of a square door.

In the opinion of the manufacturer, the simplicity of this unit, together with the precise control it provides, makes it an ideal implement for the small foundry. Complete details of the furnace and reports of actual operation will be furnished by the manufacturer.

◆ Battery Separators

The Electric Storage Battery Company 19th Street and Allegheny Ave., Philadelphia, Pa. has announced that Exide-Ironclad batteries are now equipped with separators of an entirely new material. The material, known as Exide Mipor (Reg. U. S. Pat. Off.), is a form of vulcanized rubber in sheets. The sheets are permeated with countless microscopic passages which permit free diffusion of electrolyte but prevent the most minute solid particles of active material from passing through.

These separators, vulcanized during manufacture, are said to be immune to heat developed in a battery and to have necessary mechanical strength to withstand vibration and rough conditions of service.

Longer life, reduced maintenance and outstanding economy are the advantages claimed for these new separators.

◆ Weatherproof and Dust-Tight Safety Switches

A new line of weatherproof, dust-tight Type A Safety Switches in standard sizes from 30 amperes to 600 amperes

capacity, is now being supplied by The Electric Controller & Mfg. Company, 2708 E. 79th Street, Cleveland, Ohio.

These switches are equipped with fully interlocked door, making it impossible to operate the switch with the door open, or to open the door with the switch closed. They are enclosed in a 10-gauge steel cabinet which has been rustproofed by Bonderizing before the enamel is applied. A heavy sponge rubber gasket makes a tight seal between the door and cabinet.

◆ Variable Speed Drive Development

The accompanying phantom view of a U. S. Varidrive motor shows a new lever arm construction which has been developed for the larger horsepower ratings. It also shows how the formerly separate units consisting of a constant speed motor, a variable speed device,

and a gear case have been built into one compact unit, and how the speed change is obtained by varying the effective driving diameter of the speed control discs. These discs transmit the power from the motor through a belt to the take-off shaft.

Complete information upon this development may be procured from the U. S. Electrical Mfg. Co., 1578 South Western Ave., Chicago.

◆ New Type Centrifugal Pump

The American Hard Rubber Company, 11 Mercer Street, New York City, has added a new type centrifugal pump to its line. This pump, designated as its new type WAM pump, utilizes a hard rubber casing which is claimed to be acid, heat and distortion resisting. The casing is mounted to the base by means of an acid-resisting hard rubber covered casting which also acts as a chamber to catch drip from the stuffing box. It is a pump designed for medium capacities and low heads. Complete information upon it may be obtained from the chemical equipment sales division of the company.

◆ A New Thrustor

A number of improvements in the G-E Thrustor, a self-contained combination of motor-driven centrifugal pump, oil chamber and piston that produces a smooth straight-line thrust through a definite length of stroke especially suitable for the operation of clutches, brakes, valves, doors, etc., have been announced by the General Electric Company.

The new line of Thrustors consists of a complete range of standard models providing ten combinations of thrust and stroke ratings varying from 50 to 3,200 pounds thrust and from 2 to 16 inches stroke.

In the new Thrustor, the impeller housing of the centrifugal pump is stationary, a rigid shaft running in ball bearings connecting the impeller to the driving motor. A number of driving motor arrangements are available, as are interchangeable base plates for clevis or rigid mounting of the device. Tilting as much as 45 degrees away from the vertical is permissible.

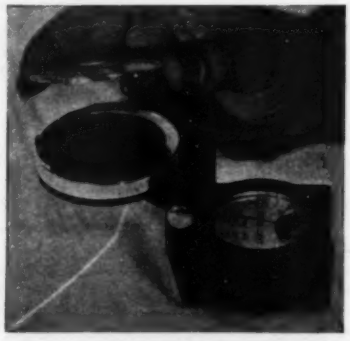
As a smooth acting, straight-line operating device, subject to manual, remote, or fully automatic control, the Thrustor is suitable for a wide variety of applications.

◆ Quick Setting Acid Proof Cement

The Technical Products Company, Pittsburgh (15), Pa., has announced a recently patented acid proof cement under the trade name of Sauer-Eisen Acid Proof Cement No. 21. This cement is a white powder of high silica content which is mixed on the job with water to a smooth, creamy consistency. An initial set of this mix occurs in about one hour and complete setting takes place within 24 to 36 hours. It is stated that setting is accomplished by chemical action rather than by drying, and that expansion and contraction troubles are eliminated by its use.

◆ Light Meter With Range Multiplier

A device for increasing the range of a light meter has been announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The device consists of a light absorbent screen, which, when clamped in front of the exposed surface of the photocell of the meter, absorbs nine-tenths of the normal light and transmits the other one-tenth to the photocell. The material selected for this screen is said to be such as to be independent of the angle of incidence of the light so as to act as a correct multiplier without regard to actual direction of the light source.



When the multiplying device is not in use it is clamped conveniently over the base of the light meter.

◆ Folke Becker Made President of Rhinelander

At the annual meeting of stockholders of the Rhinelander Paper Company, held at the company's office in Rhinelander, January 22, the following directors were elected: Folke Becker, E.

A. Forbes, W. D. Brown, A. S. Puelicher, E. A. Korth, A. C. Brown and R. L. Caldwell.

Immediately following the election of directors, the new directors met and elected Folke Becker as President and treasurer of the company. E. A. Forbes and Paule Browne were re-elected as vice president and secretary respectively.

According to a report submitted by Mr. Becker, the company made a satisfactory showing for the year just closed and has confidence for even a better showing for 1935.

◆ R. E. MARTIN, 1027 Hunt building, Tulsa, Okla., has been appointed exclusive sales agent for American District Steam Company for Oklahoma.

◆ Watson A. Yule

Watson A. Yule of Chicago, who, since 1906, had been Middle West representative for F. C. Huyck & Sons, Kenwood Mills, Albany, N. Y., manufacturers of paper makers' felts, and for the past several years a director of that company, died suddenly in Green Bay, Wisconsin, on Thursday, January 17. Funeral services were held in Chicago on January 19 and in Toronto, Ontario, on Sunday, January 20. He was buried at Aurora, Ontario, his birthplace, near Toronto.

Mr. Yule, who would have been sixty-five years of age on May 21, is survived by his widow, Mrs. Emly A. Yule, and three brothers, J. C. Yule of Arnprior, Ontario, E. W. Yule of Alexandria, Indiana, and Edmund Yule of Mount Forest, Ontario.

Before becoming associated with F. C. Huyck & Sons in 1906, Mr. Yule was connected with the Alexandria Paper Company of Alexandria, Indiana.

Besides being a director of F. C. Huyck & Sons, Mr. Yule was a director of the Fort Howard Paper Company of Green Bay, Wisconsin.

◆ ANNOUNCEMENT is made that The Pacific States Paper Trade Association will hold its convention May 9 to 11, at Del Monte, Calif.

◆ John E. Daley

J. E. Daley, one of the founders and a director of the Port Huron Sulphite & Paper Company, Port Huron, Mich., passed away suddenly January 20, while visiting his son, Walter C. Daley, at St. Cloud, Minn.

Mr. Daley was born January 6, 1859, in Lancashire, England, and came to the United States fifty-six years ago, after completing his apprenticeship in England. He was superintendent of the Port Huron Company for many years prior to being elected an executive of the company and was widely known in the wood pulp industry, particularly in the East, the Miami and Wisconsin valleys.

Mr. Daley is survived by two daughters and a son. The son, Walter C., is sales manager for the Watab Paper Company.

◆ D. W. Bergstrom

Diedrick Waldemar Bergstrom, vice president of the Bergstrom Paper Company, Neenah, Wis., passed away January 24 in Neenah after a short illness.

Mr. Bergstrom was born in Neenah 45 years ago. He received his education in the public schools there and later attended Lawrence College at Appleton. Upon his graduation from that institution, he entered the paper business of his father, the late D. W. Bergstrom.

Mr. Bergstrom was very well known in the industry and was an active figure in local and state activities. Surviving him are the widow, a daughter and three sons.

◆ SARCO COMPANY, INC., New York, has recently opened a branch office at 1025 Broad St., Newark, N. J. Walter Andrews and H. W. Angelery are in charge.

◆ Taylor Stoker Has Southern Representative

The sale of all Taylor Stoker Equipment for the Southern territory will be handled by the Boiler Equipment Service Company, 686 Greenwood Avenue, N. E., Atlanta, Ga.

E. A. Brooks, president of the Boiler Equipment Service Company, has added this new Stoker Division to the company after years of experience with power plant equipment and installations in the South. R. N. Ruiter, a stoker specialist, will be in charge of the new Stoker Division.

◆ GENERAL REFRACTORIES CO., Philadelphia, Pa., announces the appointment of Geo. F. Motter's Sons Supply Co., York Pa., as dealer-agents in the York district.

◆ Glatfelter Holds Sales Meeting

The P. H. Glatfelter Co., as part of their merchandising campaign on Monoplane Bond, has been holding territorial meetings of its agents and their sales forces.

The first meeting was a dinner held in Philadelphia January 22, and was attended by 43 members of the Garrett-Buchanan Co. and The Paper House of Pennsylvania.

Following the dinner, P. H. Glatfelter, president of the P. H. Glatfelter Co., welcomed the guests and outlined the program for the evening. A talk during the showing of moving pictures of the Glatfelter plant was made by C. H. Stallman.

The meeting was then in charge of Mr. W. S. McClellan, Vice President and Sales Manager of the Glatfelter Co. Mr. McClellan discussed the Paper Industry Code and how it applied to mills and merchants, which he followed with a demonstration of Monoplane Bond and other Glatfelter Papers, stressing their improved qualities, their many uses, and their speedy availability to the Philadelphia market.

Mr. Tracy of the Tracy-Parry Company, advertising counsel for the Glatfelter Co., followed with an interesting and inspirational talk on the advertising and promotional plans of the Glatfelter Co. for the coming year.

During the evening, Morgan Thomas, president of Garrett-Buchanan Co., and Mr. Norbert Considine, president of The Paper House of Pennsylvania, spoke, giving the men many instructive sidelights of merchandising paper, stressing the long friendship that has existed between their companies and the Glatfelter Co. and the mutual co-operation that each has enjoyed.

◆ Link-Belt Personnel Changes

Link-Belt Company announces the following promotions in its central division conveyor sales organization:

William L. Hartley, heretofore manager of Detroit office, assumes position of manager of foundry equipment sales, with headquarters in Chicago.

Harold L. Hoefman, heretofore manager of the company's Indianapolis branch, succeeds Mr. Hartley as manager of Detroit office.

Richard B. Holmes, of the St. Louis office, succeeds Mr. Hoefman as manager of Indianapolis branch sales.

Carl A. Blomquist, of Chicago, succeeds Mr. Holmes at St. Louis, where he will assist Howard L. Purdon, manager.

◆ NORTHERN EQUIPMENT CO., Erie, Pa., announces the appointment of W. J. McDonough as sales manager. Mr. McDonough has been associated with the organization since 1922.

◆ Toilet Paper Industry to Conduct Market Survey

The Interfold Toilet Paper Industry has employed R. A. Lasley, Inc., of New York City, to make a national market survey of the industry. Many types of questions will be carefully analyzed, including such pertinent phases of merchandising as the following:

Are present sales efforts as effective and intelligent as they could be?

Do the present methods of distribution offer the greatest opportunity for effective selling presentations?

Would it be more profitable to concentrate on expanding the present market or competing for existing business?

Which markets are likely to produce the most desirable volume?

Can the domestic (or home market) be successfully invaded?

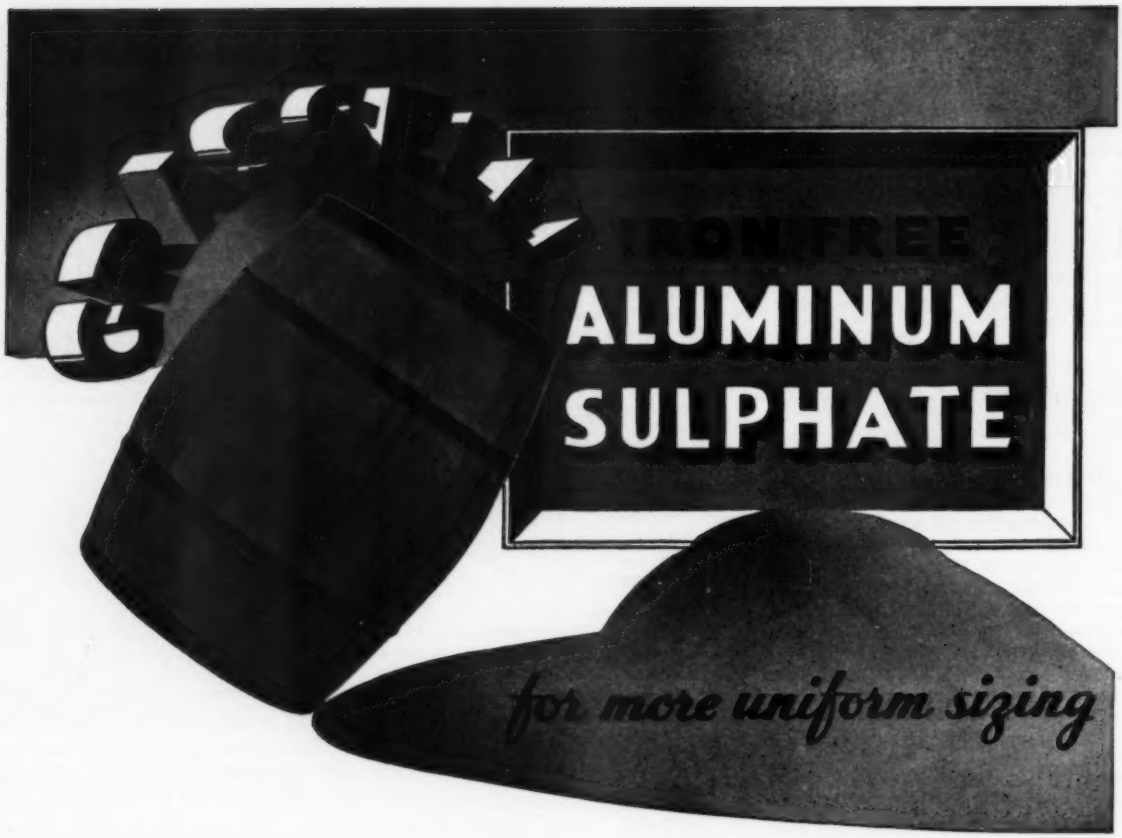
Are there any opportunities for improving the product, its cabinet, or distribution of cabinets?

What are the opinions and prejudices of the buyers of these products?

Are there any significant trends in the industry which should be taken into consideration?

What are the most costly abuses in the industry and how may they be eliminated?

It is hoped that an intelligent solution to these problems and many others will be determined from the survey, with resulting benefits to the manufacturer, distributor and consumer.



GRASSELLI Iron Free Aluminum Sulphate will win your unqualified approval, because it is a *papermakers'* alum—it is manufactured especially to meet the critical requirements of producers of high grade papers. Moreover, it is always uniform in its chemical and physical properties.

Furnished in Lump or Granulated and shipped in barrels containing approximately 400 pounds and in bags containing 200 pounds.

Other Grasselli Chemicals for Paper Manufacturers:

Acetate of Lead
Aluminum Sulphate, Commercial
Aqua Ammonia
Barium Carbonate
Barium Chloride
Barium Sulphate (Blanc Fixe)
Bleach
Caustic Soda
C. P. Ammonium Hydroxide
C. P. Hydrochloric Acid
C. P. Nitric Acid
C. P. Sulphuric Acid
Muriatic Acid
Salt Cake
Silicate of Soda
Soda Ash
Sulphuric Acid
Tri-Sodium Phosphate

AT YOUR SERVICE

Our Research Department may be of help in solving some of your problems. This service is available to you. Write, wire or phone any of our branches below.

THE GRASSELLI CHEMICAL COMPANY
FOUNDED 1839 INCORPORATED CLEVELAND, OHIO
New York and Export Office: 350 Fifth Avenue
BRANCHES AND WAREHOUSES:
Albany Birmingham Boston Charlotte Chicago Cincinnati Detroit
Milwaukee New Haven New Orleans Philadelphia Pittsburgh St. Louis St. Paul
San Francisco, 584 Mission Street Los Angeles, 2260 East 15th Street
Represented in Canada by CANADIAN INDUSTRIES, LTD.
Acids and General Chemicals Division—Montreal and Toronto

GRASSELLI

GRASSELLI GRADE
A standard held high for 96 years

◆ A. R. Small on Standards Directorate

A. R. Small, president of Underwriters' Laboratories, Chicago, has been elected a member of the Board of Directors of the American Standards Association. He represents the Fire Protection Group and the election is for the three-year term beginning January 1, 1935.

The American Standards Association, whose offices are in New York City, is an organization for industrial self-regulation working to establish acceptable engineering standards as well as to prevent over-standardization. Although its findings are accepted as final, they may be and are revised when changed conditions warrant.

◆ E. W. BIXBY has recently become associated with the Memphis office of The Pittsburgh Equitable Meter Co. He will represent both that company and its subsidiary organization, the Merco Nordstrom Valve Company, in Chattanooga and other Tennessee towns, as well as in Kentucky.

◆ Prevent Wavy Edges in Paper

One of the leading paper houses recently tried out a waterproofing solution designed to seal the fibers of paper against moisture and thereby curb the curling of the edges of the sheet.

Three piles of paper were used, one untreated and two waterproofed on the edges. At the finish of the test, the untreated pile showed a high curl, but the waterproofed piles were perfectly flat and printable. The three piles consisted of the identical twenty-pound sulphite bond. The solution is patented and contains, among other ingredients, paraffin, beeswax, paraffin oil, chloroform and ether. (From *The Inland Printer.*)

◆ CARL STRIPE, for the past two years assistant to the vice president of The Davis Coal and Coke Company, has joined the sales organization of Combustion Engineering Company, Inc. He will be in charge of industrial stoker sales under the direction of H. S. Colby, General Sales Manager, and will give particular attention to the unit which has been developed to afford small industrial and heating plants many of the mechanical and economic advantages possessed by larger stoker installations.

◆ ACCORDING to the News Print Service Bureau, the total North American output of newsprint paper in 1934 was 3,892,887 tons, of which 2,599,292 tons was made in Canada, 957,196 tons in the United States, 316,119 tons in Newfoundland and 20,280 tons in Mexico. The Canadian output was 28.9 per cent more than in 1933, that in the United States 1.1 per cent more, with a gain of 16.7 per cent in Newfoundland and a 23.9 per cent gain in Mexico, making a total continental increase of 642,570 tons, or 19.8 per cent. Reports from the United States mills for earlier years included a small amount of poster, novel and similar paper, but the 1934 figures are confined strictly to newsprint.

◆ New Catalogues and Publications

Du Pont de Nemours & Co., E. I., Wilmington, Del.—A small illustrated booklet entitled "A Story of Man-Made Rubber" has just been issued by the Rubber Chemicals Division of this company. This booklet gives a very understandable description of DuPrene, a synthetic rubber made from materials such as coal and limestone. Other publications just issued by this company include: Bulletin No. 1, a handy manual on organic chemical specialties which contains descriptions of chemicals for rag cooking and bleaching, beater, sizing, wetting new felts, washing felts, calendar coloring and sizing, toweling and blotting papers, adhesives, pitch removal and printing. Another manual, Bulletin No. 2, which deals with Brilliant Avirol and some other products for use in paper making, gives considerable data not contained in the other bulletin. Copies of these upon request.

Fibre Making Processes Inc., Chicago—A recent bulletin is devoted to the F. M. P. Circulating System for Sulphite. The description of the system is accompanied by drawings showing the general arrangement of the system and heat exchanger, also the system without heat exchanger. The advantages of the system and the savings effected are set forth in a clear and concise manner. There are a number of interesting illustrations.

F. H. Glatfelter Co., Spring Grove, Pa.—This company has sent out very attractive sample books and colorful folders publicising its Provenworth Paper and its popular bond, Monoplane. The folders on Monoplane are printed on samples of the paper itself and demonstrate effective 2-color combinations which can be used for the various colors of this line. These folders are a part of a very intensive direct mail campaign the company has instituted to be carried on during the year.

B. F. Goodrich Co., Akron, Ohio—This company has compiled a new book of engineering data designed to simplify the selection of belting, hose and other mechanical rubber goods for industrial service. There are 21 pages of useful information, which over 200 items are described. There are more than 100 diagrams and photographs. The section on transmission belting and technical data will be found most interesting and helpful. Copies may be had upon application to the Mechanical Div., at Akron.

Lawrence Pump & Engine Co., Lawrence, Mass.—A new bulletin, No. D-29 features this company's Vortex custom built stock pumps. Aside from descriptive material, the bulletin contains illustrations, graphs and a diagrammatic drawing with explanatory references. Copies on request.

McLeod & Henry Co., Troy, N. Y.—This company has just published a very attractive catalogue featuring "The Design, Installation and Service Advantages of Steel Mixture Furnace Linings and Arches for Modern Boiler Furnaces." The catalogue is very well presented, is printed in color and contains a wealth of information for operators of power plants in the paper industry.

Merco Nordstrom Valve Co., Pittsburgh, Pa.—This company, a subsidiary of Pittsburgh Equitable Meter Co., has recently issued a Service Chart, describing under the headings, Operation, Adjustment, Lubrication and Repair, the proper care for Nordstrom Lubricated Plug Valves. This chart is printed on heavy stock, suitable for tacking on the wall in operating headquarters or near Nordstrom valve installations. Copies may be obtained from the Pittsburgh office or any of the branch offices.

National Adhesive Corp., 820 Greenwich St., New York—A pocket-size handbook entitled "How to Prepare and Use Glues, Pastes, and Gums" has been issued and copyrighted by this company as one of a series of educational brochures to show users of glue how they can secure better results and stop waste due to improper handling. This handbook discusses such subjects as: the storage and care of glue, opening the barrel, removing the bung, and the proper use of spigots. It goes on to discuss the prevention of evaporation and crusting, the importance of keeping equipment clean and the correct methods of thinning and diluting prepared glues and pastes. Copies upon request.

Ohio Carbon Co., Lakewood, Ohio—For the particular interest and information of those responsible for the proper operation and maintenance of the electrical machinery in the plant, this company has prepared a booklet entitled "The Brush Phase of Motor Maintenance." This booklet deals in practical non-mathematical terms with the causes and effects of sparking, excessive wear, etc., of brushes, commutators and slip-rings on direct and alternating current motors and generators, etc. Since many of such troubles are due to faults in other parts of the machine, the book describes briefly and illustrates with diagrams the conditions of sparkless running and the effects of the applied load upon them; thus simplifying the detection of troubles before they become serious. Other sections deal with brush characteristics, selection and manufacture, and suggestions for the proper methods of maintenance of brushes, commutators and slip-rings.

Schutte & Koerting Co., Philadelphia, Pa.—A catalogue descriptive of its Rotameters has just been released by this company. The manufacturer claims this device has distinct advantages in handling fluids such as chlorine (liquid and gaseous) chlorine water, alum solutions, calcium hypochlorite, rosin size, caustic soda, sulphuric acid and others, and it is also stated that a number of Rotameters have been installed in prominent pulp and paper mills. The purpose and construction, advantages, applications, etc., are clearly set forth, and the various types of Rotameters described fully and illustrated.

BOOKS

Binders Board for Bookbinding and Other Purposes—This publication, known as Commercial Standard CS50-34, has just been issued by the Bureau of Standards, U. S. Department of Commerce. On April 19, 1934, at the instance of the Binders Board Manufacturers Association, a final joint conference of representative manufacturers and users of binders board adopted this standard for that commodity. The standards became effective for new production on October 1, 1934. Copies may be obtained from the Superintendent of Documents at Washington for five cents per copy.

Budgeting—This is a new book of 21 chapters, 164 illustrations, and nearly 450 pages, is the work of Prior Sinclair, a certified public accountant and member of the firm of Lybrand, Ross Bros. & Montgomery. Mr. Sinclair through his book has aimed to present a practical and comprehensive treatment of budgeting principles and practice. Within its pages fifteen major budgets are presented separately and discussed in detail. Among other budgets, this list includes the master budget, financial budget, estimated balance sheet, estimated profit and loss statement, production budget, materials budget, purchase budget, labor budget, manufacturing expense budget, department expense budget, administrative expense budget, and the plant and equipment budget. The book opens with a chapter on business planning, and then there are individual chapters covering essentials of budgeting, budget manual, budget analysis, profit realization chart, and budget reports and charts in addition to the chapters relating to the fifteen major budgets to which reference has already been made. The book has been published by The Ronald Press Company, 15 East 26th St., New York City, and is priced at $5.00 per copy.

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Safe Use of Belt Shippers and Construction of Ramps and Inclines

Improper use of belt shippers, poles and perches for mechanical power transmission apparatus is a source of severe injury, according to the National Safety Council, Chicago. The proper method of employing these devices is described in the Council's recently revised "Safe Practices Pamphlet No. 5," which also deals with belt shifters, clutches and remote control apparatus.

Belt shippers are employed in the shipping of belts to and from pulleys on line or countershafts. It is much safer and better practice to have loose pulleys or idlers, which make it unnecessary to ship and unship belts.

A belt should always be unshipped by throwing it off the driving and not off the driven pulley. When shipping a belt connecting a countershaft with a line shaft the belt should first be put on the countershaft pulley and then thrown onto the main line pulley.

If it is necessary for a workman to use a ladder while throwing a belt on a line-shaft pulley, another workman should be at the foot of the ladder to steady it, or the ladder should be equipped with safety hooks to prevent its swinging to one side. Such an operation should never be undertaken while the power is on. A third man at the controller can "inch" the shaft along until the belt has been put on.

When a ladder is used it should be placed on the side of the pulley opposite the belt. This position facilitates operation and reduces the danger of the workman becoming caught and drawn over the shaft.

The use of a belt pole as a substitute for a mechanical shifter should be avoided.

Where loose pulleys or idlers are not practicable belt perches in the form of brackets, rollers or other devices should be used to keep the belts away from the shafts. A perch should be of sufficient width so that the belt will not tend to creep onto the driving pulley. It also should be substantially made and so designed that the shipping of a belt to and from it can be done safely.

Revised Safe Practice Phamphlet No. 59, entitled "Warehouses and Shipping Rooms" states if ramps or inclines are made of wood, the joints should be carefully made and the planks thoroughly secured against uneven deflection. If cleats are provided to prevent persons from slipping the cleats should be placed about 14 inches apart and should extend from guard rail to guard rail at right angles to the line of travel: except where a runway is necessary for wheelbarrows and trucks, in which case the two outer planks of the runway should be equipped with cleats. In some plants covered ramps or inclines used by pedestrians are surfaced with rubber carpet or a leather mat covering. Splinters, nails, patches, irregularities, breaks or cracks in walking surfaces are dangerous and should not be tolerated.

Ramps or inclines made with granalithic or cement walking surfaces are coming into general use. Anti-slip qualities should be obtained upon these walking surfaces by rough floating. Hardeners and trowelling never should be permitted. Another way to prevent slipping is by incorporating, for each square foot of floor surface, one and one-half pounds of abrasive grit, such as alundum, in the mix for finish coat, and then sprinkling another one and one-half pounds per square foot over the surface before giving the rough coat. Others prefer the use of a number of wide strips of anti-slip tread set ten inches on center in the cement and placed at right angles to the line of travel and flush with the surface of the ramp.

Inclines should be placed where it is not necessary to travel across them. Inclines or ramps used for wheelbarrow service should be built of an odd number of planks. This will afford an even passageway in the center for the wheels.

The sheet metal "planks" used in loading and unloading box cars should always be secured in place, whether or not there is a difference in the level between the car floor and the floor of the loading or receiving platform. This can be done by the use of drop bolts. On long, movable skid boards, handles should be provided so that these "planks" or skids may be properly moved without the danger of employees' hands being caught under the skids.

NOW 97
SATISFIED PIPE BUYERS

THE NUMBER is swelling all the time—thrifty mills who use Armco Spiral Welded Pipe and like its custom-made features. Now it's ninety-seven, and there's no telling where it will stop. These wise mills have put pipe-worries behind them once and for all. They just turn their specifications over to Armco and this strong, easy-handling, smooth-interior pipe is delivered *on time* and ready to go. Good-bye delay; good-bye heavy installation costs; and good-bye frequent and costly replacements. This is the paper man's pipe-dream that comes true every time ● As we said, all you need do is send us your specifications and we'll do the rest. And you can reach us quickly at the address below.

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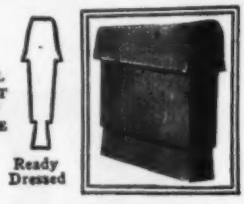
THE MOST ECONOMICAL FILLINGTHAT CAN BE PUT IN A MORTISE WHEEL



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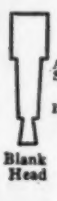

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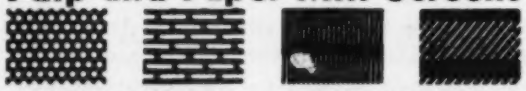

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Perforations that are accurate in size and alignment
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Machinery for Ground Wood and Chemical Pulp

THE PUSEY AND JONES CORPORATION

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PULP MILL MACH'Y ◆ FINISHING ROOM MACH'Y
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The Original LONGCRIMP FOURDRINIER WIRES

Were made by this Company in 1922. Their outstanding service is known from coast to coast.

Our Modified Longcrimp is the latest improvement in that type of wires. It has the extra life of the original Longcrimp and can be used for light weight paper.

The Lindsay Wire Weaving Co.
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VEST POCKET POWER PLANTS

Small space occupied, any capacity, low over-all operating costs, high and extreme efficiencies, reliability, low initial investment.
Complete power plants to meet any operating conditions of Pulp and Paper mills or other Industrial service. Engineering and Construction.
Satisfactory Services Always Guaranteed.

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Power Specialists
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◆ Du Pont Dedicates New Research Laboratory

E. I. du Pont de Nemours & Company dedicated and opened on January 22, its new medical research laboratory to be known as the Haskell Laboratory of Industrial Toxicology, the purpose of which will be to test thoroughly, from a health standpoint, all products produced by the Company before they are placed on the market. The laboratory was planned to meet a need which has developed in this country because of the great growth of the chemical industry as represented by du Pont. Many new products have been developed in recent years and other new products are constantly being developed, some of them through entirely new processes. A function of the laboratory will also be to study the possible effects of the new products upon the health of employes during the process of manufacture.

The importance of the analyses and studies to be made will readily be understood by that large group of manufacturers who use du Pont products as raw materials in their business. It will mean that before new products are produced on a large scale and put on the market, they will be given the most thorough examination and the most exhaustive study in regard to any potential danger which might exist, either on other industries during the process of manufacture or the effects on general consumers who may buy them from manufacturers. Its staff will be the largest and its equipment the most extensive of any laboratory in the world. Its director is Dr. W. F. von Oettingen who received his chemical training at the University of Jena and Goettingen, Germany, and his Ph. D. degree at the University of Goettingen. Later he studied medicine and the relation between chemical constitution and pharmacological action. Finishing his pre-clinical course in Goettingen, he entered the University of Heidelberg, where he specialized in internal medicine and pharmacology. He came to this country in 1924 and the following year joined the staff of the medical school of Western Reserve University in Cleveland.

◆ Reduction of Duties Opposed

The Committee on Public Affairs of the American Paper Industry is preparing, with the assistance of the Import Committee, presentations of the Industry's attitude toward the proposed reciprocal tariff agreements with the Netherlands and Finland, on which hearings are to be held in Washington in early February. Any proposals for the reduction of duties on any of the papers produced in these countries will be opposed, as these countries are both selling their product in this country even now at prices below American costs of production.

During January action was initiated by the Import Committee of the American Paper Industry for the proper classification or valuation of some fifty shipments of various foreign papers, the shipments involved being valued at over $100,000.

During December importers in United States Customs Courts abandoned cases involving a variety of papers in which they had originally protested against action of Customs officials. The value of the paper involved was about $50,000.

◆ Preparation of Metal Surfaces for Painting

Metal cleaning before the application of metal protective paint coats is essential because:

There must be nothing present under the paint film which can promote corrosion.

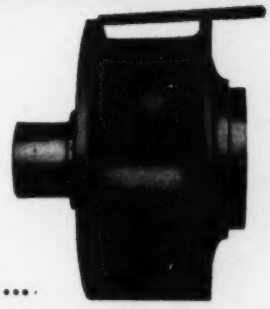
The paint must be able to bond intimately and firmly with the metal to adhere perfectly.

New structural steel, steel plate, etc., should have all dust, dirt and mill scale incidental to manufacture cleaned off before priming.

Galvanized iron usually has an oil surface that can be removed with a wash of eight ounces of copper acetate or copper sulphate in one gallon of warm water. Weathering is also helpful. Sand blasting is the best method of cleaning surfaces that are rusted or covered with loose scaly paint. Where sand blasting is not available or too expensive the surface should be thoroughly scraped, chiseled and wire brushed. (From *Paint*—Magazine of the Sherwin-Williams Co., Vol. 1, Dec., 1934.)

The MORRIS HYDRAULIC COLUMN

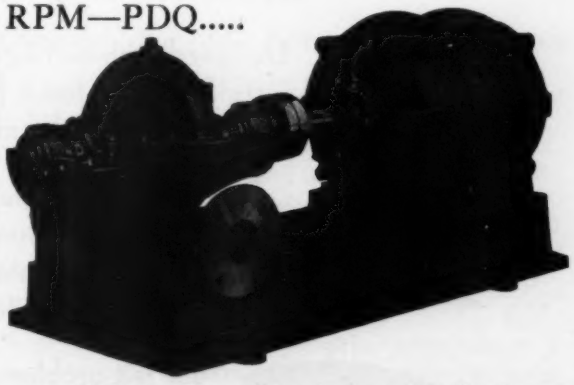
News of interest to Centrifugal Pump Users



Never even gagged ....

You've heard those wonderful stories about the sizes of objects that can be swallowed by some varieties of fishes and snakes. Here is a bonafide photograph of the enclosed impeller of a 10-inch Morris Centrifugal Pump with an 8-inch diameter wooden (not rubber) ball just emerging at the periphery after having passed through the water passages from the suction intake. There's little cause for worry about operating interruptions in a Morris Non-clogging Pump — whether used for sewage, paper stock, or any other kind of pulp.

RPM—PDQ.....



3500 RPM is quite a fast gait for a centrifugal pump. However, this Morris High Speed Double Suction Pump has a constitution that will stand the pace indefinitely. It won't lose its balance, or get hot under the bearing collars, or chatter from weakness of any kind.

If you want a direct-connected pump for drive by high speed turbine or motor, here's a unit that can take it. You'll find all the details in a copy of Bulletin 150 which we are holding for your request.

Valuable but Not for Sale.....

The 70-year experience of the Morris Engineers can't be bought, but is offered free for the solution of any pumping problem. It makes Morris recommendations authoritative and it makes Morris designs handle their jobs effectively and efficiently. If you want to find out how it can be applied to your own pumping requirements, write to Morris Machine Works, Baldwinsville, New York.

Appleton Felts

Make Good Paper

Behind this trade mark is everything essential to make good felts—experience, design, plant control and reputation.

Appleton Felts today have in them the accumulated experience of over forty years of felt making.

Designed with technical foresight as quality products first, Appleton Felts are then made as only quality felts can be made.

Every plant operation is checked—rechecked, not once, but several times from the selection of the raw wool to the last step in manufacture to make sure all felts are as uniform as a plant can make them.

Your felt problems will receive our careful attention. Let us help solve them for you.

Quality ... Service Uniformity Finish

APPLETON WOOLEN MILLS

APPLETON, WISCONSIN

The Paper Industry Safety Contest

July 1, 1934 to June 30, 1935

Scores as of December 31, 1934 (Cum.)

20 Mills Maintain Perfect Record

PERFECT SCORES

Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A			
GROUP B			
GROUP C	St. Croix Paper Co.	Woodland	Maine
	Escanaba Paper Co.	Escanaba	Michigan
	Crystal Tissue Co.	Middletown	Ohio
GROUP D	Kimberly-Clark Corp.	Lakeview	Neenah, Wis.
	Sylva Paperboard Co.	Sylva	North Carolina
	Bergstrom Paper Co.	Neenah	Wisconsin
	International Paper Co.	Webster	Orono, Maine
	Bird & Son, Inc.	Phillipsdale	Rhode Island
	U. S. Envelope Co.	Worcester	Massachusetts
	International Paper Co.	Livermore	Chisholm, Maine
	Spaulding Fibre Co., Inc.	New Mill Plant	Milton, N. H.
	International Paper Co.	Riley	Maine
	U. S. Gypsum Co.	Gypsum	Ohio
	Spaulding Fibre Co., Inc.	Hayes	North Rochester, N. H.
	Mead Paperboard Co.	Rockport	Indiana

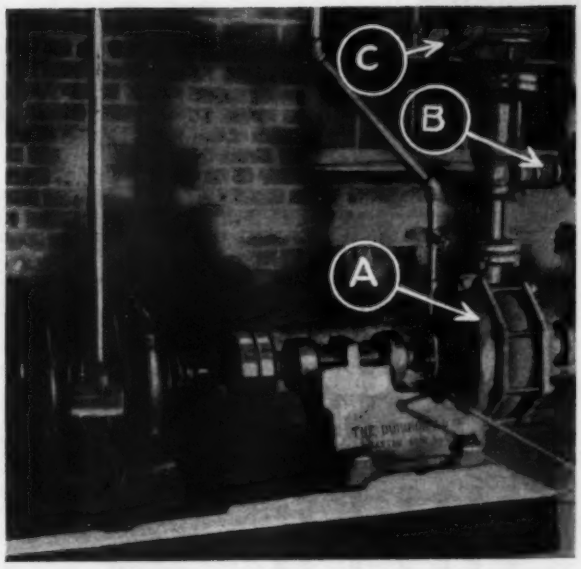
Division II—Remanufacturing

Texas Corrugated Box Co.	Dallas	Texas
Container Corp. of America	Natick	Massachusetts
Southern Container Co.	Houston	Texas
U. S. Gypsum Co.	Genoa	Ohio
Bemis Bros. Bag Co.	East Pepperell	Massachusetts

IMPERFECT SCORES

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP A	P-19	1	1	1.495
	P-108	2	5	4.552
	P-64	3	5	5.502
	P-62	4	6	6.318
	P-13	5	6	6.780
	P-18	6	8	7.190
	P-27	7	10	7.448
	P-10	8	5	8.284
	P-30	9	6	8.309
	P-44	10	8	10.462
	P-12	11	7	10.937
	P-67	12	13	12.427
	P-95	13	9	13.831
	P- 1	14	15	14.478
	P-114	15	15	14.982
	P-31	16	13	15.611
	P-69	17	15	18.776
	P-102	18	21	20.923
	P- 2	19	15	22.221
	P-101	20	15	24.440
	P-87	21	23	26.139
	P-28	22	55	26.279
	P-78	23	19	28.250
	P-74	24	37	48.552
	P-71	25	42	65.195
GROUP B	P-23	2	2	3.472
	P-68	3	2	4.317
	P-21	4	3	5.609
	P-40	5	4	7.588
	P-25	6	3	8.035
	P-56	7	3	8.326
	P-70	8	4	8.709
	P-11	9	5	12.505
	P-60	10	6	12.910
	P-112	11	6	12.916
	P-45	12	9	16.624
	P-46	13	7	19.232
	P-22	14	9	21.162
	P-16	15	11	26.780
	P-82	16	13	26.913
	P-76	17	11	27.703
	P-26	18	13	28.687
	P-77	19	11	30.533
	P-73	20	14	30.885
	P-32	21	17	36.292
GROUP C	P-72	3	1	3.220
	P-100	4	1	3.819
	P- 3	5	3	8.871
	P-43	6	3	14.019
	P-79	7	4	14.297
	P-51	8	5	15.008
	P-88	9	3	15.228
	P-17	10	3	15.332
	P-48	11	5	18.322
	P-89	12	3	18.838
	P-61	13	5	19.426
	P-59	14	6	19.488
	P-104	15	7	19.875
	P-41	16	9	21.861
	P-75	17	5	22.261
	P- 4	18	5	22.422
	P-29	19	6	27.182
	P-33	20	7	29.221
	P-14	21	6	31.735
	P-49	22	8	37.144
	P-113	23	10	49.386
	P-47	24	17	66.870
	P-50	25	22	113.991
GROUP D	P-94	13	1	7.329
	P-109	14	1	8.637
	P-99	15	1	15.280
	P-110	16	1	19.450
	P- 7	17	3	21.694
	P-107	18	3	22.019
	P-42	19	2	23.468
	P-83	20	4	26.727
	P- 5	21	5	28.486
	P-93	22	2	30.310
	P-24	23	4	39.919
	P- 8	24	4	48.357
	P-98	25	8	75.669
DIVISION II	R- 2	6	1	3.147
	R-16	7	1	5.837
	R-10	8	2	6.340
	R- 5	9	3	6.768
	R- 6	10	4	7.305
	R- 3	11	1	10.773
	R- 9	12	4	25.707
	R- 1	13	8	37.824
	R-13	14	7	50.004

No December Report: P-73, P-83, P-88, P-89.



(A) Direct-drive Duriron Centrifugal Pump. (B) By-pass to make-up tank. (C) Duriron-Nordstrom lubricated valve to storage tank.

So Simple . . .
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One of the 2G Series of Duriron Centrifugal Pumps at Work . . .

This pump handles 250 g.p.m. of calcium hypochlorite bleach and transfers it to storage tank. Under 80 ft. head, pump lifts 75 g.p.m.

Neat and compact; embodying great strength because the entire pump housing is held rigidly under compression by six through-bolts.

All parts are interchangeable; replacements easily made when necessary. The metal resists corrosion and prevents contamination of the bleach.

For details send for Bulletin No. 172. Our extensive experience with problems of corrosion in the pulp and paper industry is available upon request.

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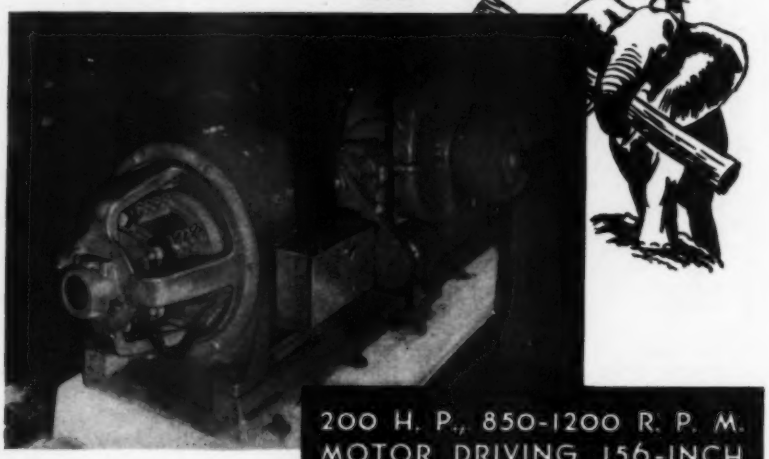
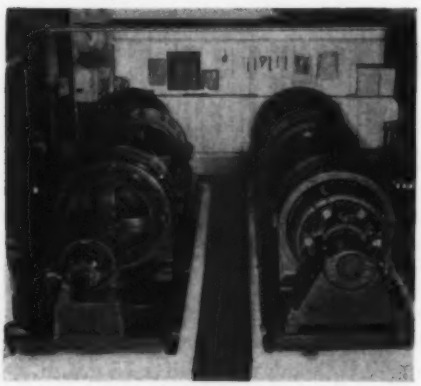
DURIRON

Durco Alloy Corrosion-Resisting Steels for the Sulphite Mill.

HEAVY DUTY D-C Motors for PAPER MILLS



200 H. P., 850-1200 R. P. M. MOTOR DRIVING 156-INCH PAPER MACHINE



THE FACT that the paper machine is the most important item in the mill means that the motor which drives it must be selected with care. Good speed regulation, continuous operation, and reliability are requirements the electric motor must fulfill.

These qualities are inherent in Reliance Heavy Duty Type T Motors for they were designed to meet just these conditions. Liberal electrical design and rugged mechanical features insure steady operation over a long period of time, thus protecting the mill from costly shut-downs.

Reliance engineers have long been active in applying power to paper-mill machinery. You are invited to make use of their experience in this work.

Above—Variable Voltage M-g. Sets which provide wide selection of speeds in paper machine drive.

Right—Reliance Type T Motors drive these paper machines at the Bergstrom Paper Co.

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POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Maintenance Costs Should be Segregated

In many plants the expense of maintenance is thrown into the cost records of operation in such a way that it is not possible to segregate the replacement items and the labor which go to make up maintenance. For that reason it is not possible to determine whether maintenance is 5 per cent or 25 per cent of the operating cost.

If such costs are accurately kept, they may be used for a variety of purposes which are entirely apart from an analysis of plant performance. It is possible, for instance, to check the labor material and costs for keeping different pieces of equipment in first class operating condition. These figures may then be used as a guide in changing types of apparatus or materials.

Aside from consideration of efficiency, upkeep costs afford a strong argument for replacement due to obsolescense. If a recommendation is to be made which calls for junking a piece of equipment, a detailed record of the cost of maintenance helps to place the recommendation on a businesslike basis.

◆ PRIMING, that undesirable condition in which liquid water leaves the boiler with the steam, may be caused by sudden variation in evaporation and may be caused by quick change from half to full speed of the engine, the sudden opening of a large valve, etc.

◆ Routine Tests of Boilers and Accessories

Successful operation of a boiler depends to a large extent upon the condition of the accessories which serve to guide the fireman and insure safe operation. Tests of such equipment should therefore be made matters of routine so that any faulty condition will be promptly discovered.

Provisions for safety, of course, take precedence over equipment provided for economy and for this reason the safety valve is given first consideration. At least once each day the safety valve should be opened, either by raising the steam pressure until the valve blows off or by pressing against the lever until the valve releases. If the valve sticks or too great a force is necessary to open it, extreme care should be taken to keep the pressure below normal popping off point until the valve can be replaced or put in proper condition. The valve may be in perfect condition, but the steam pressure gauge may read too high which can be determined by comparison of the readings of the steam gauges on the boilers in the same battery when supplying a common header, or by checking the gauge on the boiler against a test gauge.

In testing the safety valve, by raising the pressure in the boiler it is always a good plan to note the amount of blow back, i. e., the drop in pressure from the time the valve starts to blow until it closes. If the drop is too great, there will be unnecessary loss of steam and, if not great enough, the valve may be required to blow several times before the furnace conditions can be changed sufficiently to meet the lower rate of steaming required.

Before a boiler is put into operation, after being down for inspection or repairs, it should be given a hydrostatic test to a pressure 50 per cent greater than that at which it operates. This is accomplished by filling the boiler with water and, by means of a pump, raising the pressure to the desired point. With this pressure on the boiler, inspection of all joints should be made for leaks. This test will also show up other points of weakness such as holes due to corrosion or cracks, but a hammer test should also be given the boiler before it is filled with water. Defective parts of a shell or tube will be revealed by a dead or cracked sound when struck light blows with a hammer.

Many times firemen have been deceived by indication of the water level in the gauge glass. A stoppage of either connection to the boiler will cause a false indication and unfortunately either of these conditions will indicate high water level. At least once each watch the attendant should blow down the water column and note the rapidity of the return of water in the gauge glass. It should be rapid, almost instantaneous, otherwise an obstruction should be looked for. The gauge cocks also serve to check the indications of the gauge glass, but cannot be depended upon absolutely, where they are attached to the water column as is the usual custom, for the column connection may be stopped.

◆ IT IS a good plan to have a safety valve so arranged that when the disc is raised to try out the valve, the man doing this may watch the pressure gauge and the gauge glass. Any unusual disturbance in the water level or steam pressure may indicate that priming or foaming is taking place due to the rapid outflow of steam.

◆ Combustion Efficiency

Visible smoke is composed chiefly of fine particles of carbon and tar. When seen under the microscope, the particles are shown to be really clusters of smaller particles, each about 0.000,002 in. in diameter. Because of their small size these clusters are carried easily by even the slowest moving gas stream. These particles when glowing are the cause of the visibility of the furnace flame. The actual carbon in dense smoke amounts to about 1 per cent of the carbon in the coal or fuel oil, and is not in itself the main source of loss. It is generally accompanied, however, by non-visible but highly combustible gases, the loss of which may amount to 10 per cent. High CO and smoke in the stack gases represent high losses, not so much because of the losses in these two themselves but because they indicate the presence of unburned hydro-carbons. At the same time smokeless combustion does not necessarily indicate perfect combustion. It is a simple matter to burn coal or oil smokelessly, but to burn it smokelessly and without loss is a difficult matter. The best results and the highest sustained efficiency of combustion are being attained when there is a slight feather or wisp of hazy smoke at the stack.

◆ FOR EACH 11 deg. Fahr. that the feed water is below 212 deg. Fahr., 1 per cent of the fuel is wasted. For example, feed water at 45 deg. Fahr. is equivalent to a fuel loss of 16 per cent.

◆ Painting in the Power Plant

One gallon of linseed oil plus 40 lb. of white lead will cover from 250 to 350 sq. ft. of outside work with a good first coat. The same quantity will second-coat and finish from 350 to 450 sq. ft. White lead when used on inside work turns blackish-yellow on account of exposure to the sulphurous fumes from gas or coal. White zinc is preferable for inside work, but, having less covering capacity, and less opacity, more coats are required.

For iron and steel work, red lead, 49 lb. per gal. of oil, is an expensive but durable covering. To prevent blistering on outside work, boiled oil should be used. Turpentine only should be used for thinning. Knots and pitchy surfaces on wood should be coated with shellac varnish, and all grease, scale, acid, and moisture should be removed from all work before painting. Graphite mixed with linseed oil and laid on in fairly thick coats makes a good paint for metals. Iron pipes, stacks, boiler fronts, etc., may be painted with asphaltum thinned with turpentine.

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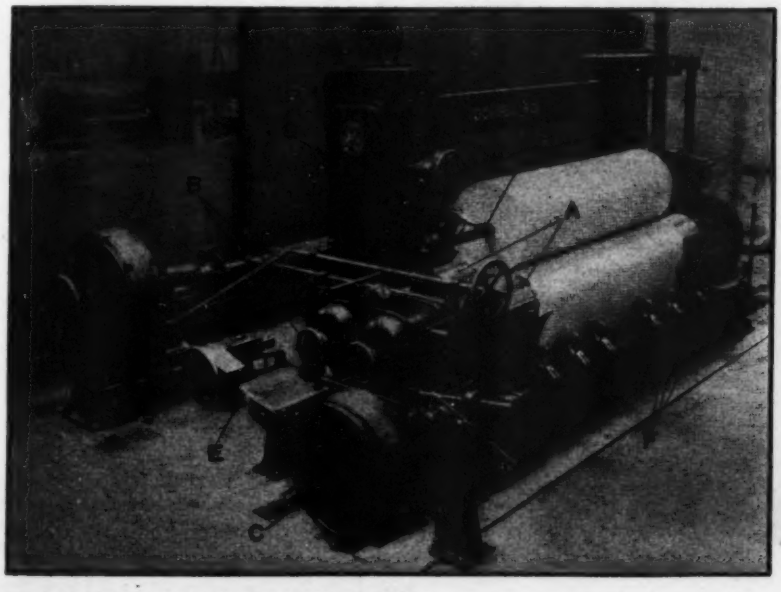
TECHNICAL DEVELOPMENTS

IN THE PAPER INDUSTRY

The following abstracts are of the latest developments found in the foreign press and in the patent offices. Photostats and translations of complete articles and patents can be obtained at cost price.

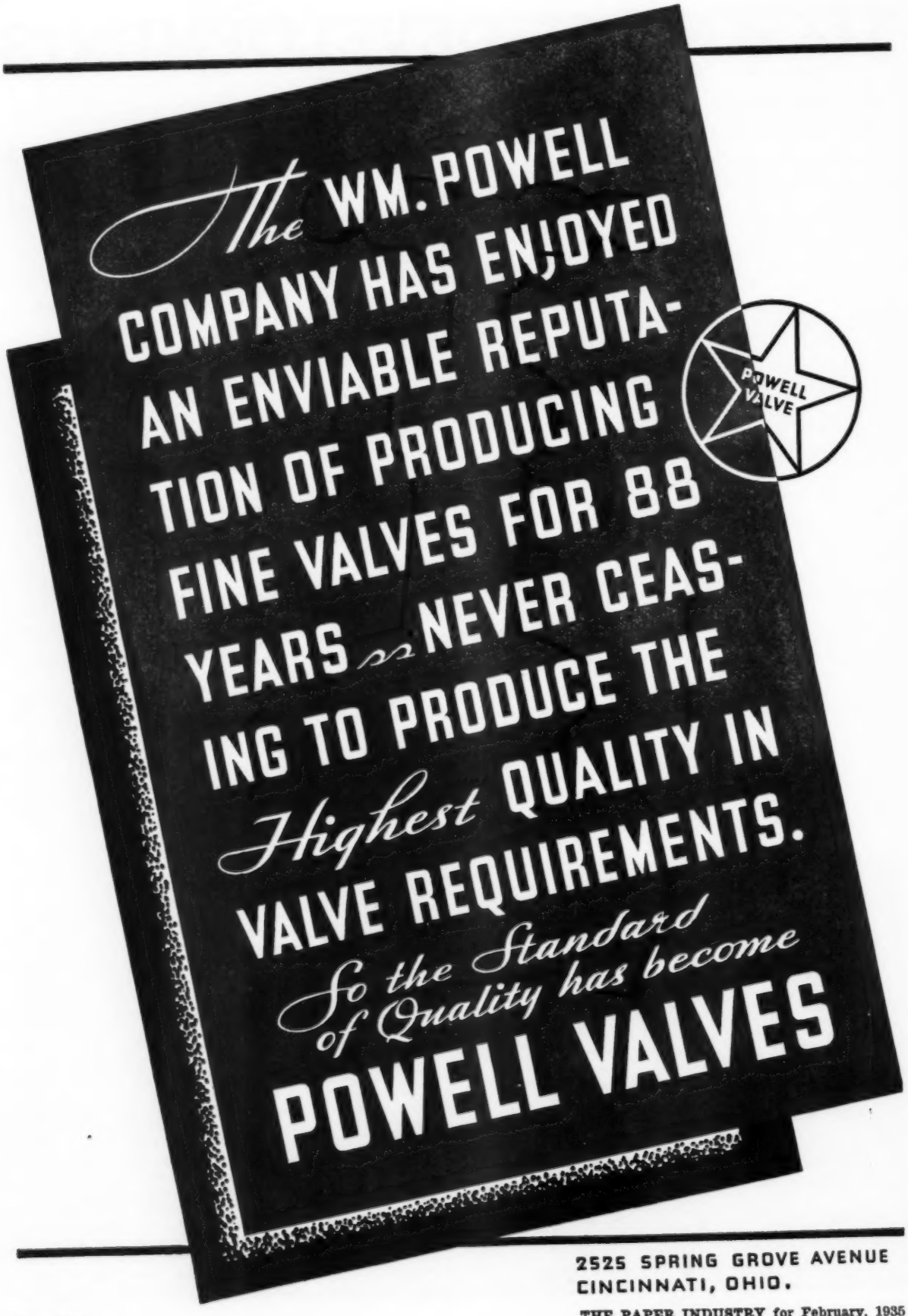
◆ The New Goebel Slitter and Rewinder

The machine shown in the illustration is used in slitting and rewinding cardboard. With a width of 200 centimeters and a maximum speed of 280 meters per minute, its power consumption is about 20 kw. (In an actual demonstration recently held, in which a machine of this type slit and rewound board varying from 200 to 600 grams per meter, the speed attained was 160-200 meters per minute). The movable parts are enclosed, and dust-proof roller bearings or ball-bearings are used. The reel bar is driven through the action of a differential gear. The feed-roll is directly driven, and the drive is distributed in each case to the two carrier rolls (A) by means of a chain drive over a friction clutch. A brake, on the long shaft of the feed roll, permits steering the differential gear so that the reel-bar gets an extraordinary driving impulse, thus insuring a harder winding effect. There are three fundamentals that determine the different degrees of hardness with which reels are wound. (1) The two carrier rolls (A) can be driven at peripheral speeds that vary from each other, by the use of special frictional devices. The speed of one of these rolls may be caused to lag as much as 3 per cent behind that of the other. Here a handwheel adjustment (B) is brought into play. As an example, the speed of the front carrier roll may be so accelerated that a softer winding takes place. The opposite effect may also be achieved. (2) The driving action on the feed roll and on the rolls (A) may be controlled and reduced by the brake (C). Thus the peripheral speed of the shaft (D) is increased through the increased driving action over the differential gear, which, in turn leads to a corresponding increase in the hardness of the roll. (3) By the addition of counterweights, the pressure that the reel-bar or the reel exerts on the rolls (A) may be varied so that the hardness of the winding increases with increasing pressure. The front carrier roll may be raised or lowered at will. If it is lowered, the reel-bar is supported to a greater extent by the back carrier roll, thus obviating folds and pockets, during the reeling process. An entirely new feature is claimed in the means of loading or removing the load from the reel-bar by the use of movable levers and of the weights (E). As the reel diameter increases, the pressure of the reel on (A) would normally also increase. However, during the course of the operation, by the automatic control of levers and weights, the pressure can be kept almost uniform, thus obviating the usual change in hardness which increases from the interior to the exterior part of the roll. Instead of the older screw and wing-nut, a simpler clamp-leverage arrangement serves to fix the bar reel with precision and safety. The cutters (F) are fixed to an immovable framework of the machine, below (A). The slitting goes on steadily without swaying movements, and the cut is smooth and dustless, even when heavily loaded cardboard is being slit and rewound. A moistening device may also be built into the machine, and this and its operation are briefly described. H. Frank. Wochenbl. Papierfabr. 65, No. 42,741-2 (Oct. 20th, 1934).



◆ Thioglycollic Acid As a New Lignin Reagent

This important article gives a comprehensive survey of a novel means for the characterization of lignin, not only in various important woods, but wherever it occurs in the plant kingdom. The method as applied to spruce wood is as follows: After extracting the sample with acetone and water, ten grams are heated on a water bath for 4 hours with 5 grams of thioglycollic acid in 50 cc. of 2N HCl. Thereupon the undissolved material (A) is washed with 100 cc. water, the aqueous solution filtered and then extracted with three successive 100 cc. portions of ether. These combined ether extracts, on evaporation, yield unchanged thioglycollic acid, thus giving some measure of the amount of reagent actually consumed in the reaction. The aqueous (extracted) solution is evaporated to dryness in vacuo, and the residue is determined. The undissolved material (A) is then extracted at room temperature for 24-48 hours with alcohol, the extract filtered, and the residue (B) washed with 100 cc. alcohol. These alcoholic extracts and washings, on careful evaporation, yield what the author terms lignothioglycollic acid-1 (Li.-th. 1). Thereupon (B) is treated at ordinary temperature with 100 cc. of 0.5N. NaOH for 24 hours, and then washed with water. The brown alkaline filtrate and washings are acidified with 15 cc. of 5N. HCl, and the precipitate thus formed, after being allowed to stand over night, is heated for 15 minutes on a steam bath. On cooling, a resin-like substance forms, which is pulverized under water, filtered, washed, and air-dried on porous plates. This (in the form of a cream-colored powder) was always the main produce of the reaction, and was termed lignothioglycollic acid-2 (Li.-th. 2). Since, after further washing with water and alcohol (B) still responded to the phloroglucinol test, the residue was again subjected to the original treatment, this time, however, with only 2 grams of thioglycollic acid, in 20 cc. 2N. HCl. After the washings and extractions outlined above, (B), on further extraction with dilute NaOH, yielded a small portion of Li.-th.-3. Of the 3 fractions Li.-th.-2 usually represented over 80 per cent of the total. On analysis it has an empirical formula corresponding to about $[(C_{40}H_{49}O_{12})(3CH_2SHCOOH)]$.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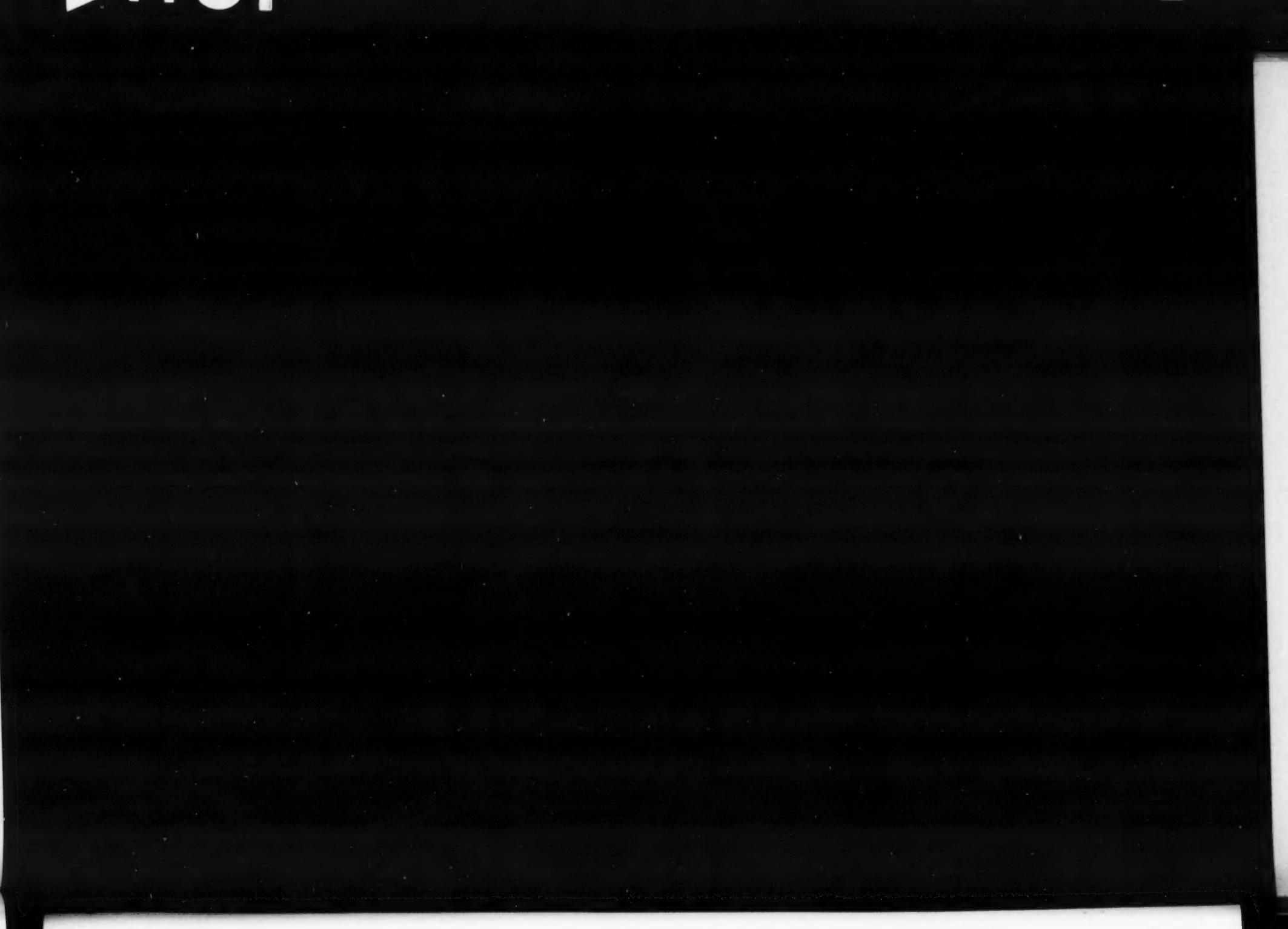
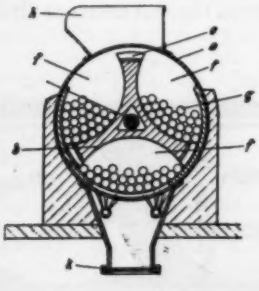
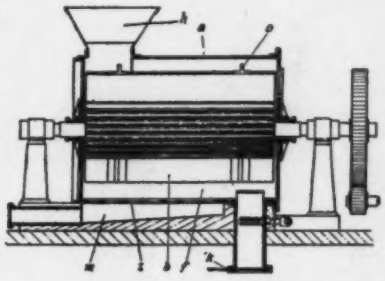


Naturally the results obtained by this method of isolation, which are not strictly quantitative, are lower than those found by the sulphuric acid method for lignin. They vary from 22-28 per cent lignin (calculated on the thioglycollic acid-free basis), whereas Klason found a mean of 28.1 per cent lignin in spruce. The same method of isolation was applied to various algae, lichens and fungi, most of which are practically lignin-free. Only the punk-forming fungus, Polyporus fomentarius L. contained what appeared to be a lignin fraction, which, however, was free from methoxyl groups. Similar lignin-like compounds were isolated from certain mosses and horsetails. The author found it essential always to check his results by analyses for carbon, hydrogen, methoxyl and sulphur, since at times precipitates were obtained under the conditions given for the isolation of the Li.-th.-2-fraction (given above), that were obviously quite unrelated to lignin. Various conifers (Eastern hemlock, larch, Scots pine, and cedar) gave lignin derivatives, the composition of which was very similar to that obtained from spruce. Calculated on the thioglycollic-acid-free basis the methoxyl content of the coniferous lignin usually varied from 14-17 per cent. The hardwoods (which included aspen, black alder, hornbeam, beech and walnut among others) showed lignin derivatives which also closely resembled those of the softwoods. Here, however, the methoxyl content (calculated on the thioglycollic-acid-free basis) usually varied from 20-23 per cent. The monograph represents a great amount of work, the results of which are summarized in 20 tables. The method also serves in isolating cellulose, although not quantitatively. Bror Holmberg. Ingeniörs Vetenskaps Akademiens Handlingar (Proceedings of the Royal Swedish Inst. for Engineering Research), No. 131, p3-85 (1934).

◆ Rod Mill

While the drum (a) remains stationary, a revolving propeller shaft (b) (so shaped that in cross section it appears as a series of symmetrically placed arms with concave sides) serves to divide the drum into various (perpetually changing) cells (f). At the outset of the operation, each cell is provided with a suitable number of rods (g) which are not only free to move and roll along the surface of (a), but are also tumbled against the concave sides of the shaft (b), the blade ends of which are provided with ledges (o) so that they very nearly contact the inner wall of (a) during each revolution. The spaces between (o) and (a) are sufficient to permit the passage of pulp (but not of a rod) from one cell (f) to the next. The pulp is introduced at one end of the drum (a) through the hopper (h). At some distance below the other end of (a) is a throttle valve (k) that regulates the rate at which the pulp passes through the rod mill, thus controlling the degree of beating. At the very lowest part of (a) are perforations (l), and below these is a gutter (m) from which impurities are removed from time to time. Hermann Mallickh, Düren. German Patent No. 566,975, Kl. 55c.



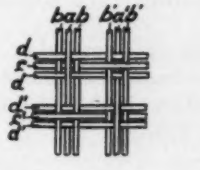


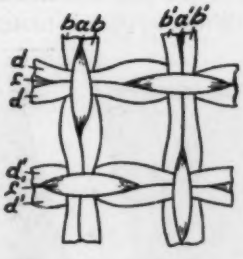
◆ Wheat Straw Pulp by Chlorination

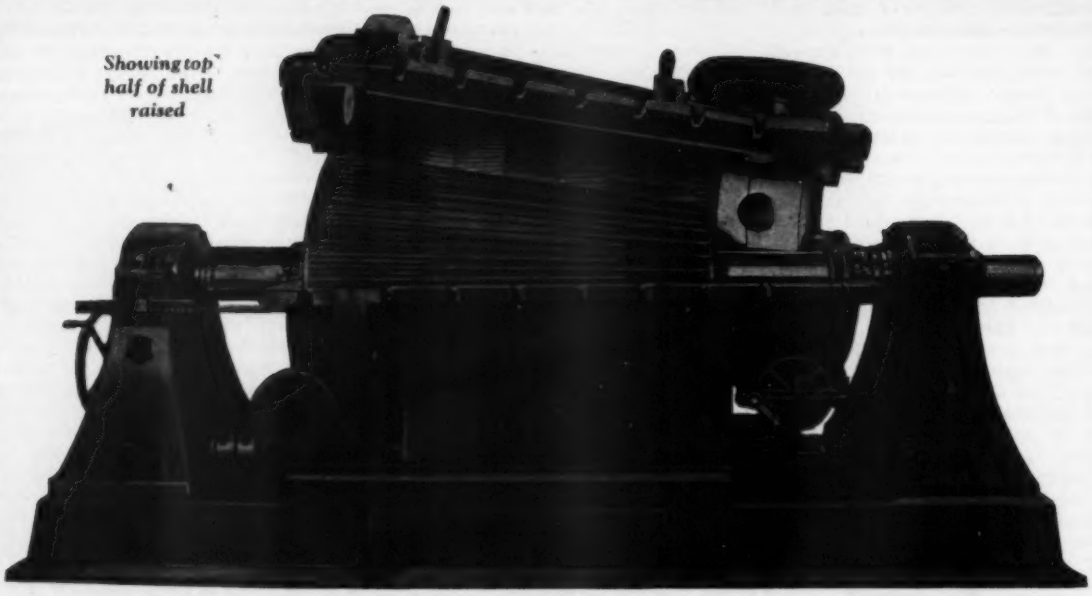
A description of the latest developments under the Pomilio patents, in the plant of the Cia Manufacturera de Papeles y Cartones in Puento Alto, near Santiago, Chile. With the completion of this mill, 45 tons of pulp made by direct chlorination are now produced daily by the Pomilio method:—10 tons in the Elettrochimica Pomilio at Naples, Italy; 15 tons at the Cellulosa Argentina, in Juan Ortiz, Rosario, the Argentine; and 20 tons in this, the most recent of the operations in Chile. The Electrolytic Division is equipped with 60 electrolytic cells, ranged in two batteries. Salt is brought from Punta de Lobos (north of Antofagasta) and from this a daily yield of 6000 kilos NaOH, 5300 kilos of chlorine, and a corresponding amount of hydrogen are obtained. About 60-70 per cent of the caustic soda and chlorine are used at the plant in the delignification. Residual NaOH is sold and the remaining chlorine is converted into HCl, NaOCl, chloride of lime (for the market) and bleach liquors that are used at the mill. The feature of this installation is that (in counterdistinction to other plants erected by Pomilio) the process is continuous in all its phases both mechanical and chemical. Blowers are used to convey the cut, screened straw directly to the apertures of towers equipped with peripheral steam inlets and supplied with dilute caustic soda solution, through which the raw material is transported at just the right speed by means of screw-conveyors. Thence the cooked material is conveyed mechanically to caustic towers, ranged on a lower level than the first, and then thoroughly washed, the wash waters being used in the tower in which the preliminary operation is carried out. In the next step the straw is pressed until it retains a definite percentage of water, and is then blown to the chlorination towers where it meets a countercurrent of chlorine at such a rate that the conversion of lignin to chlorolignin is insured. This chlorolignin is then removed in suitably placed tanks which also contain caustic soda, and thereupon the pulp is screened and bleached with calcium hypochlorite, washed and the stock pumped to nearby papermachines. The process is continuous and the various stages are carefully synchronized. (Unfortunately no illustrations accompany the brief description.) Chile uses her own raw materials (straw, coal, salt and lime) and, as the result of the erection of this latest plant, is now entirely independent of foreign imports of pulp and paper. Pompeo Pizzini. Raca Revista Argentina de Colorantes y Auxiliares en La Industria, 3, No. 21, 11; through Papier-Fabr. 32, No. 40, 417-19 (1934).

◆ Wet Felts

The object of the invention is to secure a weave in the felts that will insure freer passage of water by preventing the displacement of the woolen thread, with resulting diminution in the size of the pores. This is accomplished by weaving a wide meshed fabric, keeping the threads of the warp and woof in the relative positions shown schematically on the left, where the warp threads are illustrated by (b) (a) (b) and (b') (a') (b') while the threads of the woof are shown as (d) (c) (d) and (d') (c') (d'). The larger figure on the right illustrates how these threads are drawn together during the functioning of the felt. The outer warp threads (b) (b) and (b') (b') function similarly as do the outer woof threads (d) (d) and (d') (d'). The middle threads (a) and (a') function alternately as the upper and lower warp, and (c) and (c') act alternately as the upper and lower woof threads. Where the warp and woof intersect the threads are firmly pressed together, and forced to maintain their respective places. This results in a firm interlacing of threads and groups







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ASSURES PEAK EFFICIENCY • LOW OPERATING COSTS

If you are seeking maximum savings and minimum maintenance in Jordaning, you'll soon select the Jones split shell adjustable Jordan, because it offers more value.

For example, it assures duplication or continuation of desired Jordaning results by its precision adjustment and alignment of plug and shell.

Saves time and labor when refilling, cleaning or examining because of split, assembled type of shell and bandless plug (no extra charge for bandless filling).

The non-adjustable Bandless Plug increases life of fillings, as plug is mounted on stationary anti-friction bearings, eliminating all plug play and keeping plug in perfect alignment with shell.

Stationary anti-friction bearings allow plug to be easily interchanged and eliminate vibrations and weaving formerly caused by looseness between sliding bearings and their guides.

Saves space by eliminating the old, troublesome method of pulling the plug horizontally.

These modern features combine to give that operating efficiency which produces a more uniformly Jordaned stock, as well as important operating and maintenance economies needed to assure excellent returns on the investment. Bulletin on request.

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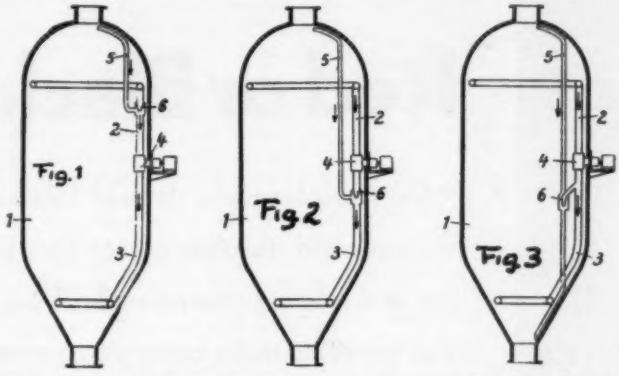
E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.

Builders of High-Grade Machinery for Paper Mills

of threads, which prevents these from being displaced. Hence the pores or meshes remain open constantly. Eduard v. Asten; Hauset (Belgium). German Patent No. 602,753, Kl. 55d.

◆ Circulation of Gases and Liquor in Digesters

The patent claims a means of conveying relief gases and liquor from the upper part of the digester into the lower portion. To avoid the disadvantages resulting from external relief (e. g. separation of lime with possible plugging of the line) the pipe lines for gas (5) and for liquor (2) and (3) are so arranged within the digester that (2) may be provided with a jet apparatus or injector (6). This arrangement allows the liquor and gases to be drawn in the direction of the arrows, from the top to



the lower part of the digester, and may be so regulated that a definite mixture of gas and liquor can be maintained within the line during the entire cook. In Figure 1, the gas line enters the liquor line at the same point at which the jet apparatus (6) is connected. In the Figures 2 and 3, modifications of the same principle are shown. In Figure 3, the gas and liquor lines are kept separate, with an injector arranged in line (5) so that both the gas and solution may be conveyed. Otto Kreisler and the Metallgesellschaft A. G. Frankfort a. M. German Patent No. 601,271, Kl. 55b.

◆ Constitution of Cellulose

A resumé of the author's recent work. Through the investigations of Haworth and Freudenberg, the fact has become well established that cellulose is built up quantitatively by the coupling of glucose residues according to a definite pattern. However it is not correct to speak of a unique cellulose of definite molecular weight. Different cellulose molecules contain the identical unit cell (i.e. the same anhydroglucose linkage) it is true, but the number of these cells and the length of the molecules vary. Apparently the method of determining the mean molecular weight of cellulose which has been open to least criticism is that of viscosity of very dilute solutions of cellulose itself (in Schweizer's reagent) or of cellulose esters in suitable organic solvents. This method furnishes evidence that the compounds are not contained in solution as micellar aggregates, but as true molecules. This evidence was obtained by converting a so-called polymeric homologous series into a series of analogous polymers. For example cellulose acetate may be reconverted into cellulose, or cellulose may be converted into cellulose nitrate (and the viscosities of these conversion products in solution may be determined. The author compares the various cellulose molecules with very long, very thin plastic rods. For a high molecular cotton cellulose having a degree of polymerization of about 750 (i. e. containing 750 anhydroglucose units) the approximate molecular weight is 120,000, the number of atoms is about 16,000 and the length of the molecular chain is approximately 4000 Ångström Units. The ratio of length to width is about 500 to 1. The ability of cellulose to crystallize, to swell, and the nature of cellulose sols are all in harmony with these molecular dimensions and with this type of molecule. The author outlines the various hypotheses dealing with the constitution and magnitude of the cellulose molecule. The micellar theory advocated during the past decade (which was supported largely by X-ray investigations, the data of which could be misinterpreted) have been abandoned largely by the experimenters themselves. Only Prof. Kurt Hess still maintains his thesis that cellulose is of low molecular weight. H. Staudinger. Chem-Ztg., 58, 145-148 (1934) through Papier-Fabr. 32, No. 40 (Auszüge) 49 (1934).

◆ Sulphite Pulping Changes in Spruce

The average composition of Swedish spruce wood is: 42 per cent cellulose, 26 per cent hemicellulose, 27 per cent lignin, 1.4 per cent acetyl, and 3.6 per cent of miscellaneous components, including resin, ash, protein, etc. Of the 26 per cent hemicellulose about 19.5 per cent (9 per cent mannan, 4 per cent xylan, and 5.5 per cent glucosan, (the difference remains unexplained—Transl.) is readily hydrolyzed in the sulphite digestion, while 6.5 per cent hemicellulose (3 per cent mannan, 3 per cent xylan and 0.5 per cent levulan) is hydrolyzed with greater difficulty. These figures are given for a cook used in the preparation of strong sulphite (i. e., a pulp containing 5-6 per cent lignin). The boundary between readily and difficultly hydrolyzed cellulose is not a sharp one. As previously shown [Cf. THE PAPER INDUSTRY, 16, No. 8,587 (NOV., 1934)], of the 4.5 per cent methoxyl of the wood, approximately ⅛ is a part of the carbohydrate portion. Sugar formation and delignification are separate processes, and not interrelated. The sugar appears to result exclusively from the easily hydrolyzed portion of the hemicelluloses. This sugar formation is, in part, subject to an oxidation-reduction process, under the action of the sulphite liquor and combination with bisulphite, which accounts for the formation of aldonic acids (where the aldehyde group of the sugar is oxidized to a carboxyl group) and of thiosulphate. This gives a clue as to why liquors rich in lime (and combined SO_2) gives less fermentable sugar than do those with a low lime content. In the reaction with lignin, the sulphite rapidly forms a sulphonic acid containing about 1 sulphur atom for every 40 carbon atoms. A second sulphur atom is taken up slowly and probably with the aid of the hydrogenions of the cooking liquor. The sulphonic acids are very strong, and although quite insoluble are largely dissociated. During every moment of the pulping process there is a redistribution of calcium ions and hydrogen ions between this insoluble acid and the liquor. So there is always a certain amount of free sulphonic acid present in the solid phase. The hydrogen ions of the acid catalyze the hydrolysis of the highly polymerized solid sulphonic acid, whereupon the depolymerization products enter solution. Here the acid is sulphonated further, and this additional sulphonation increases with increasing bisulphite concentration of the cooking liquor. E. Hägglund, Pappers- Trävarutid. Finland, 16, 383 (1934); through Papier-Fabr. 32, No. 38, (Auszüge) 41 (1934).

◆ Roe Number in Estimating Mechanical Pulp

Provided the Roe numbers of the mechanical and chemical pulps used in a certain paper are known, a simple determination and calculation serve to determine the mechanical pulp content of the paper. Assuming that the Roe number of the paper is the mean of the respective Roe numbers of its various fibrous components, the paper sample is first extracted with alcohol to remove rosins. The ash content is then determined, and the chlorine number determined on the ash-free basis. (If kaolin is present a correction factor must be applied.) If the Roe number for the mechanical pulp used is 34.4 and that of the chemical pulp is 5.0, then the per cent of mechanical pulp present in a paper having the Roe number (k) is represented by (x) in the following formula:

$$(x) = \frac{100\ (k - 5.0)}{34.4 - 5.0}$$

Values thus found with samples of known mechanical pulp content show good agreement between calculated and actual figures. H. Alquist: Svensk Pappers-Tidn., 37,306 (1934).

At The End Of The Year....?

What will your books show . . . .

Red or Black?

◈ Do you plan to go through 1935 with the same old obsolete out-of-date beating and refining equipment? If so, can you expect to make better paper or make it at a lower cost? ◈ If you want to improve quality and cut your costs, get rid of worn out equipment for beating and refining and install FRITZ REFINING AND HYDRATING MACHINES. This equipment will help you to make better paper, and at the same time will cut your costs because they require much less power than ordinary beaters for the same capacity. ◈ There are many other advantages in using this equipment, which we shall be glad to tell you about if you will write us.

LOVE BROTHERS, INC. ◈ AURORA, ILLINOIS

The COMMERCIAL OUTLOOK

New York, February 1, 1935.

ON the eve of another American Paper and Pulp Association annual convention, the paper industry is in a fairly active as well as moderately healthy position. Demand for most grades of paper is developing in steady fashion even though in somewhat restricted volume as respects some classes of paper. Mills as a general thing are managing to keep passably well engaged, though of course they could readily accommodate considerably more business if it were obtainable. Sentimentally, the industry is hopeful and in a far improved frame of mind than has been seen at times during the last few years; despite the feeling that the future holds much uncertainty, there is a decidedly optimistic air in trade and manufacturing circles.

The improvement which started in the paper industry in 1933 was extended and amplified during 1934, says a survey of the industry just completed by Dun & Bradstreet, Inc. Influenced by the changed industrial conditions, production and distribution were substantially in excess of the volume recorded for the year preceding, in spite of numerous interruptions to progress, particularly during the third quarter. With the trend in both these divisions now strongly upward, a long step toward complete recovery is expected to be made during 1935, as overproduction and price-cutting appear to have been brought definitely to an end, and the year has opened with cheerfulness more widespread than at any time since 1928, the survey continues.

The survey points out that production at most paper mills showed a substantial increase during 1934, and is now estimated at generally 30 to 40 per cent above the low level touched in 1932, with the result profits are becoming more general and some paper manufacturing firms are out of the red for the first time since 1930.

Thus, it can be taken from this authoritative survey that the industry heads into 1935 on a firm foundation built up during the last year and a half, and with prospects favorable. Much, it would seem, depends on paper manufacturers and distributors themselves, whether or not they maintain the price stabilization which has been erected, and continue to cooperate in preventing overproduction. Certainly, from all present indications, a further gain in paper consumption will be witnessed this year. Also, additional improvement in general business is forecast on nearly all sides, and if this proves to be the case, the paper industry will unquestionably share to its full degree. Therefore, it would appear much depends on the attitude and policy of paper manufacturers and jobbers themselves.

Up went the price of newsprint, and almost as quickly down it came again. After announcement by the leading United States and Canadian manufacturers of a $2.50 per ton advance in the contract basis for publishers on standard print paper during the first six months of 1935, a removal of this rise was announced on January 23, the International Paper Company taking the lead in rescinding the price increase after having been the first, or one of the first, producing companies to announce the rise. A letter from the I. P. Company mailed to its publisher customers said:

"On November 10 we announced an increase, effective January 1, of $2.50 a ton in the net cost to you of newsprint under your contract with us. Since then tendencies toward higher costs have shown no abatement, but it has become clear that other manufacturers are delivering newsprint at the 1934 price to such an extent as to make the increase at this time unfair to our customers. Therefore, the contract basis during the first three months of 1935 will revert to the 1934 price level."

With the output of newsprint by Canadian mills in December showing one of the largest gains in the history of the industry, production for 1934 by United States and Canadian mills increased 608,710 tons, or 20.61 per cent, to the highest total for any year since 1930, according to figures of the News Print Service Bureau. Canadian mills during December manufactured 239,544 tons of newsprint, an increase of 64,240 tons or 36.64 per cent over the 175,304 tons produced in the similar 1933 month. This extreme increase presumably represents stocking by publishers who wished to secure as much paper as possible before the announced $2.50 a ton price advance was to go into effect on January 1.

United States mills produced 79,777 tons in December, which was 1,118 tons or 1.38 per cent less than the 80,895 tons produced in the same month in 1933. Combined output for both countries amounted to 319,321 tons in December, compared with 256,199 tons in December, 1933 a rise of 63,122 tons or 24.63 per cent.

Total 1934 newsprint production in Canada was 2,596,691 tons, an increase of 587,665 tons or 22.25 per cent over the 2,009,026 tons produced during the preceding calendar year. In the United States, however, production last year barely exceeded that of 1933, totaling 964,971 tons, or 2.18 per cent above the 943,926 tons produced in 1933. For both countries the output was 3,561,662 tons in 1934, contrasted with 2,952,952 tons in 1933, a gain of 20.61 per cent.

An approximate average gain of 16 per cent was shown in advertising during 1934 in comparison with the preceding year, according to compilations by Printers' Ink. Newspaper advertising rose about 10 per cent last year. From an index of 98 in 1921, newspaper advertising mounted to a high of 119 in 1929, and then began to decline, reaching 67 in 1933, and now standing at 74. Magazine advertising stood at the index figure of 68 in 1921 and increased to 125 in 1929. It fell to 59 in 1933 and recovered to 74 in 1934.

Production of paperboard in the United States showed a seasonal decline in November, amounting to 227,733 net tons, compared with 263,679 tons in the month before, and 206,933 tons in November, 1933, according to the Census Bureau's monthly summary. The November output brought the total for the first eleven months of last year up to 2,573,550 tons, against 2,736,397 tons in the corresponding period of 1933. New orders received by mills in November called for 218,980 tons of board, against 255,744 tons in the preceding month, while unfilled orders held at the end of November were for 62,352 tons, against 68,756 tons a month previously. Shipments of board from mills aggregate 193,372 tons during November, contrasted with 226,740 tons in the preceding month, and stocks on hand at mills at the close of the month amounted to 72,592 tons, against 73,325 tons at the end of October last.

◆ ◆

◆ Alfred Kullman Addresses Engineers

Alfred Kullman, research engineer, of the Mechanical Power Engineer Association, addressed a group of 51 of Philadelphia's most prominent engineers in the Benjamin Franklin Hotel, Thursday, January 10th, on the subject "The Modern Group Drive" and its application.

R. M. Pindell, president of Alexander Brothers, opened the meeting with a short welcoming address. Then followed luncheon and a film on "Modern Drives" accompanied by an electrically transmitted talk by Victor A. Hansom, R. E.

After the luncheon, Mr. Kullman again addressed the meeting in the Philadelphia Electric Company's exhibit room where he demonstrated a working model illustrating the comparison of efficiency between the Modern Group Drive and Direct Drive.

◆ WILLIAM BOND WHEELWRIGHT is now connected with Bradner Smith & Company, Chicago paper merchants. Mr. Wheelwright is editor of the company's new house organ, *Paper & Printing Digest*. The January number was the first issue of the new publication.

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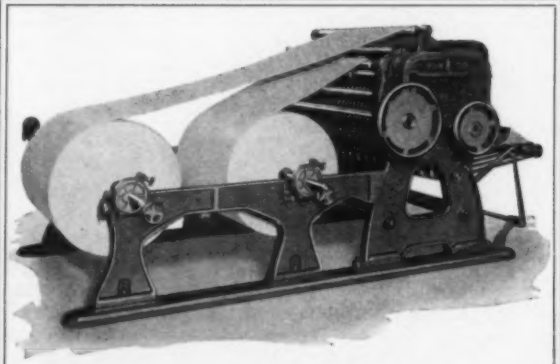

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Hudson Sharp Machine Company
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For The Papermaker's Library

Papermaking Research Around the World, by Dr. Louis E. Wise.

Identification and Microscopy of Woods and Wood Fibers Used in the Manufacture of Pulp, by Ellwood S. Harrar and J. Elton Lodewick.

Lessons in Paper Making, Part 1, by Harry Williamson.

Lessons in Paper Making, Part 2, by Harry Williamson.

Practical Helps for the Mill Man.

Each one of these publications contains a wealth of information, and they are priced at only fifty cents per copy prepaid.

THE PAPER INDUSTRY
333 North Michigan Avenue
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Domestic RAW MATERIALS

◆ Papermaking Rags

A distinct advancing tendency is observed in some classes of papermaking rags. The market as a whole exhibits greater firmness than has been witnessed in a long time; even though consuming mills are moving slowly and cautiously in their purchasing, quotations are stiffening and rag dealers and packers are showing more independence concerning prices, not hesitating to refuse bids which fail to come up to their ideas of prevailing market levels. The strength of the market seems founded, in chief measure, on the fairly bullish supply condition existing. There is no scarcity of rags yet it is evident the supply position is somewhat dangerous; in short, should consuming needs increase to a fair degree and paper manufacturers be obliged to enter the market for larger amounts of rags, there seems no doubt something of a pinch in available supplies might ensue.

The probability, or possibility, of this developing explains why rag dealers are displaying more firmness regarding prices, and why they are more careful sellers. Very inclement weather conditions over most of the country, with heavy snows and bitter cold, have slowed down rag collections appreciably. Importations are down to a low level; in fact, Government figures show that more papermaking rags are being shipped out of the United States than are being imported—taking the records for last year as a criterion. Also, foreign markets are in most cases higher than prevail here, so that importers are hard pressed to acquire supplies abroad at prices which conform with paper manufacturers' buying ideas. Moreover, consumption of rag stock in this country actually has increased—this being particularly true as respects roofing rags and some of the finer grades used by writing paper mills.

Probably of all rags, roofing descriptions show greatest price firmness. No. 1 domestic roofing has sold in the East at 1.25 cents per pound f. o. b. dealers' shipping points, and No. 2 roofing stock at 90 cents per hundred pounds. It is possible that these figures have been exceeded in exceptional instances. The Federal Government's home rehabilitation program has resulted in a larger use of roofing felt, and a proportionate increase in roofing rag consumption, with prospects favorable for further increase in both cases. Foreign roofing rags are quoted well above a parity with domestic; in most quarters at least 1.60 cents a pound is asked for linsey garments and 1.30 cents for dark colored cottons, the two grades corresponding with domestic No. 1 and No. 2 roofing stock, respectively.

New cotton cuttings are quotably firm. Some sizable lots of certain grades have been exported from the United States, resulting in diminishing the available supply in the market. Dealers in the East are generally asking at least 6.25 cents a pound f. o. b. shipping points for No. 1 new white shirt cuttings, while 6.50 cents is quoted on unbleached muslins, 4.25 cents for light silesias, 5.75 cents for bleached canton flannels, 3.75 cents for blue cheviot and overall cuttings, 2.25 cents for fancy shirt cuttings, 3.25 cents for black silesias, and 1.75 cents for washables.

Old whites are selling in a small way at steady price levels, between 2.50 and 3 cents a pound, according to grade, being asked for No. 1 whites. Thirds and blues are relatively quiet and reported obtainable at 1.15 to 1.25 cents a pound at shipping points.

◆ Old Paper

Since the removal of the Government fixed minimum prices, the market situation in low grades of old paper has been somewhat chaotic. Packers and dealers have sold old folded newspapers and mixed paper at very low prices, especially in the East where the market has declined to exceedingly low levels. Mixed paper, it is said, has been bought by consuming mills in some cases at 10 and 15 cents per hundred pounds, and folded news at 20 and 25 cents. However, heavy snowfalls over nearly all the northern part of the country, including New York where 18 inches fell in one storm, have stiffened the price situation owing to a falling off in collections, and the market now exhibits a firmer complexion.

Late reports state that eastern dealers are demanding at least 30 cents a hundred pounds for folded news f. o. b. shipping points, and 20 cents for mixed paper. In the Middle West, prices well above these prevail, dealers asking and receiving 37½ cents for folded news and 27½ cents for mixed paper at shipping points. High and medium grades of waste paper rule steady in value. No. 1 hard white shavings are around 2.25 cents a pound f. o. b. shipping points, No. 1 soft white shavings 1.85 cents, No. 1 hard white envelope cuttings 2.85 cents, old No. 1 kraft paper 90 to 95 cents a hundred pounds, heavy book stock 50 to 55 cents, and old corrugated boxes 40 cents, with western dealers usually asking and getting above these prices.

◆ Pulpwood

The pulpwood market is steady of tone, and supplies are reported moving freely. No changes in quotations are noted, but they are well maintained on a basis of approximately $12.50 a cord in Upper New York State for four-foot peeled wood.

◆ Mechanical Pulp

There seems to be a moderate demand for mechanical pulp, yet the undertone of prices is none too firm. If anything, the quotable level is slightly down from the basis recently ruling. It is stated that $27 a ton represents about the high point of the market for Canadian groundwood delivered to converting mills in New York State or other eastern points, and, depending on freight, consumers are buying in some cases below this price. Very little domestic groundwood is selling in the open market and prices are on about the same level as Canadian pulp. Fair amounts of Scandinavian groundwood are selling on a price level with Canadian and domestic pulp.

◆ Chemical Pulp

Established bases on chemical wood pulp as fixed by open price agreement continue to prevail, and most converting paper mills and domestic pulp manufacturers and importers are adhering to these prices. However, it is not denied there is some under-selling, or reselling, despite the concerted efforts of those who realize that unless pulp price levels are sustained, there is small chance of maintaining paper prices.

The pulp market is quiet at best. Consumers as a general thing are buying in very cautious fashion, seldom absorbing other than needed supplies, and in many instances apparently being well enough supplied to enable them to keep almost entirely out of the market. This situation, of course, does not aid the price condition, because in a dull market there is the temptation to concede something in price to accomplish sales. Prime domestic bleached sulphite is 2.75 cents per pound upwards on an ex dock Atlantic seaboard basis while domestic unbleached sulphite is 2.10 to 2.30 cents a pound, depending on grade. Domestic bleached soda pulp is 2.50 cents a pound delivered paper mills. Domestic kraft is mainly nominal in price, very little moving in the open market, though some Canadian kraft pulp is selling on a competitive level with Swedish kraft at around 2 cents a pound delivered.

◆ Rope and Bagging

Demand for bagging is looking up, and prices evince a firming trend. No. 1 scrap bagging is quoted to paper mills at 1.20 to 1.25 cents per pound f. o. b. shipping points, and roofing bagging at 75 to 85 cents a hundred pounds. The old rope market is quiet and quoted rates unaltered at about a basis of 2 cents per pound for domestic or foreign No. 1 old manila at shipping points.

◆ Chemicals

Steadiness marks quotations on papermaking chemicals. Bleaching powder is 1.90 to 2 cents a pound f. o. b. works for bleach in drums. Caustic soda is 2.60 cents upwards a pound for the solid product, while soda ash packed in bags is quoted at 1.25 to 1.40 cents at works. Domestic casein is on a price range of 10.50 to 11 cents per pound, and imported 13.50 to 14 cents.

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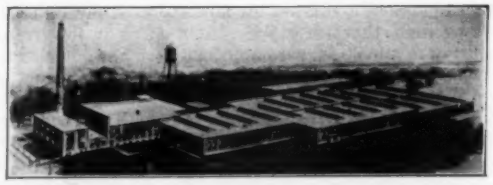

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PAPER AND PULP MILL CATALOGUE

333 N. Michigan Avenue, Chicago, Illinois

Import and Export MARKETS

IMPORTS

◆ Wood Pulp

It is admitted on all sides of the trade that the market for imported wood pulp is quiet. This is nothing new because the market has been slow decidedly for several months. For some reason or another, paper manufacturers in common are holding off purchasing, in spite of reports of fairly broad manufacturing activity throughout the industry. Doubtless the price situation has considerable to do with the attitude of paper manufacturers toward their principal raw material.

Every feasible effort is being made to maintain minimum prices established by open price agreement. Converting mills in this country and producing mills abroad are cooperating in this move, and pulp importers and agents in a large majority of instances are adhering steadfastly to these sales levels. However, it is acknowledged there is some underselling or reselling, and it would appear paper manufacturers are holding back in buying until better satisfied what the outcome of the price control likely will be.

Signs are many consuming mills are eating into their stocks of pulp as well as using up incoming supplies against contracts or old orders. At any rate, the feeling in the pulp trade is that consumption of pulp is comparatively large, and in view of this, it is believed the present quiet state of the market can only lead in due time to much broader buying and a generally livelier market. It is nothing unusual for papermakers to buy the bigger portion of their pulp needs for a year within the short space of time of a few months, this having been the case during the last two calendar years. It is probable therefore that when the market opens up, business in pulp will assume wide dimensions, and much of the loss in business volume in recent months will be made up.

Meanwhile there are occasional tonnage purchases reported for forward shipment from primary sources abroad, and also fair demand for spot lots of pulp. Quotably speaking, prices are fully maintained on established levels. Prime bleached sulphite is 2.75 cents a pound upwards ex dock American Atlantic seaboard, with high grades ranging up to 3 cents and more. Prime strong unbleached sulphite is 2.10 to 2.20 cents a pound ex dock, and easy bleaching and Mitscherlich grades 2.25 to 2.30 cents. Prime Scandinavian kraft pulp is 1.65 cents ex dock, with some of the extra desirable brands quoted several dollars per ton higher.

Imports of wood pulp into the United States during November last amounted to 130,411 long tons of chemical, valued at $5,484,323, according to official U. S. Department of Commerce figures, compared with 148,157 long tons of a declared value of $6,078,351 in the preceding month, and 195,387 tons of a value of $7,006,171 in November, 1933. The November, 1933, imports were the largest in any month in that year, incidentally. The November imports brought the total for the first eleven months of last year up to 1,319,184 long tons of chemical pulp, contrasted with 1,405,119 tons in the similar period of 1933. Groundwood imports in November were 16,703 long tons, valued at $339,202, against 14,722 tons of a value of $291,467 in the month before, and making a total for eleven months of last year 152,708 long tons, compared with 173,515 tons in the corresponding 1933 time.

Imported groundwood is quoted at $22 to slightly less per short ton ex dock New York for dry pulp, and moist is on about this same price level.

◆ Paper Stock

Importations of papermaking rags into the United States in November amounted to 7,186,269 pounds for a declared value of $110,473, contrasted with 8,966,088 pounds of a value of $112,750 in the preceding month, making a total for eleven months last year of 96,843,126 pounds valued at $1,243,512, representing a big decrease from the 159,577,257 pounds of a value of $1,264,415 imported in the similar time of 1933, according to U. S. Department of Commerce reports. Imports of miscellaneous paper stock, including old rope, bagging, waste paper, etc., in November last were 4,709,263 pounds of a value of $93,876, against 3,339,522 pounds of a value of $31,655 in the preceding month, and bringing the total for eleven months last year up to 49,153,552 pounds of a value of $716,091, contrasted with 97,294,533 pounds of a value of $1,043,165 in the first eleven months of 1933.

◆ Paper

Paper imports into the United States in November last fell a little below the total value of the preceding month's receipts, yet imports for the first eleven months of 1934 registered a substantial gain over the same time of 1933. November imports of all kinds of paper reached a value of $7,625,716, compared with $7,827,902 in October of last year, making a total for eleven months of $78,210,814, against importations having an aggregate value of $70,365,163 in the first eleven months of 1933. Standard newsprint comprised the bulk of paper imports last year, totaling in value $68,689,230 in eleven months, contrasted with $62,532,774 in the same 1933 period. Cigarette paper, the next most important item, was imported to the value of $3,874,999 in the first eleven months of 1934, against $2,814,525 in the corresponding time of 1933.

EXPORTS

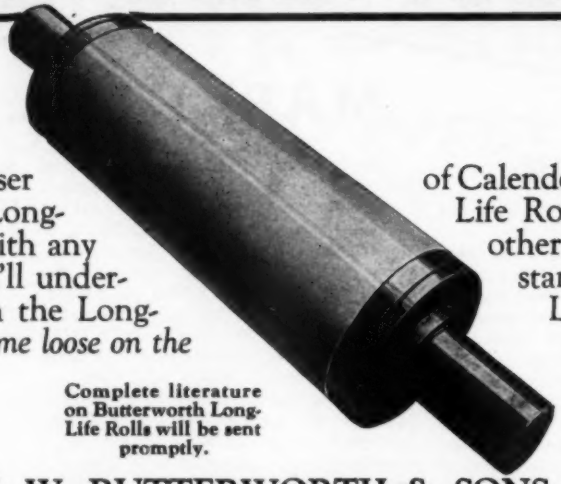
Statistics covering the first eleven months of last year show that the United States increased its export trade in paper and paper products appreciably over the preceding year. Eleven-month shipments during 1934 totaled in value $17,357,479, according to U. S. Department of Commerce reports, including $1,807,934 worth of exports in the month of November last, showing an approximate increase of 33 per cent compared with exports valued at $12,968,017 in the first eleven months of 1933.

Exports of newsprint paper in November amounted to 4,076,232 pounds, valued at $80,861, making a total for the first eleven months of last year of 41,638,646 pounds of a value of $877,596, against 17,681,759 pounds of a value of $360,369 in the same time of 1933. Uncoated book paper shipments out of the country in eleven months last year were valued at $822,410, compared with $779,644 in the corresponding 1933 period. Wrapping paper exports last year in eleven months totaled in value $1,813,774, against $1,111,528 in 1933, while writing paper exports were valued at $1,154,209, compared with $803,495 in 1933. Greaseproof and waterproof paper was exported to the value of $809,343 in eleven months of 1934, against $701,063 in the preceding year, and tissue and crepe paper shipments were valued at $598,869, against $500,893. Exports of cover paper were valued at $123,008 last year in eleven months, against $96,018 in the preceding year; of toilet paper, $547,354, against $481,166; of sheathing and building paper, $203,917, against $159,036 and of blotting paper, $168,507, against $133,527.

Boxboard exports were valued at $880,249 in eleven months of 1934, compared with $807,679 in the same 1933 period.

Paper base stock exportations from the United States mounted sharply last year compared with the year before, totaling in value $7,242,699 in eleven months, contrasted with $3,360,061 in the corresponding 1933 period. Sulphite wood pulp comprised the bulk of these exports, amounting in value to $6,045,961 for 109,540 long tons exported, against 60,794 tons of a value of $2,648,492 exported in the same time of 1933.

Have you made this test?



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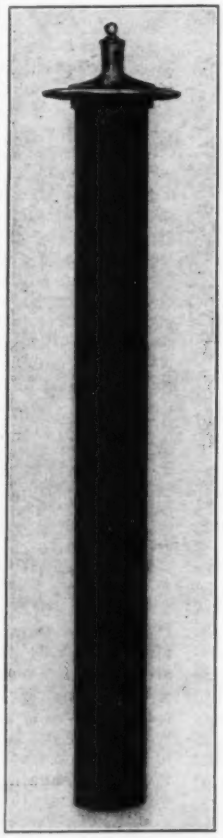

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